REPORT TO CITY COUNCIL

Approved by:

Matt Watson, Fire Chief

Arnoldo Rodriguez, City Manager

Council Meeting of: November 3, 2021

Agenda Number: D-1

SUBJECT:

Purchase of Rosenbauer Type-1 Custom Fire Engine and Related Budget Amendment

RECOMMENDATION:

Adopt a Resolution Approving a Purchase Agreement for a Rosenbauer Type-1 Fire Engine from Rosenbauer South Dakota, LLC under Sourcewell Cooperative Purchase Contract #022848-RSB; authorizing execution by City Manager; and approving amendment to the 2021/22 adopted budget appropriating $751,459.74 for the purchase in the Measure K Fire Budget for the Purchase of Equipment

SUMMARY:

The City owns and maintains a fleet of fire engines. Engines respond as first out from one of the City's three stations, while older engines are kept on reserve to be made available when one of the primary engines is out of service or for routine maintenance. The requested engine will replace a 1990 Grumman engine (E257) that is 32 years old housed at Station 57. While the 1990 Grumman has served the City well, it is showing signs of wear. The problem is exacerbated given that replacement parts are becoming increasingly difficult to locate.

It is noted that typically, frontline service for an engine is 15 years. After 15 years, engines are often placed on reserve status for an additional 5 years, for approximately 20-year service life. E257 currently serves as a reserve engine. The new engine would serve as the frontline engine and the existing frontline engine would be moved into reserve status.

Wait times for construction of a new engine are in excess of one year. If approved, it is anticipated that the new engine will be delivered in approximately 395 days.

DISCUSSION:

Staff researched types and style of engines exhaustively. While there are many engine types, their purpose differs. The National Fire Protection Association (NFPA) classifies engines by type and function. While staff is proposing a fire engine, its most recent purchase was a fire truck. The difference between a fire engine and a fire truck is that a truck is designed with a ladder on top and may be used for rescue, forced entry, and/or ventilation, whereas an engine typically carries more equipment, and lacks the ladder. Typically, a truck is more expensive than an engine. In terms of engines, some common types are identified in Table 1.

Table 1: *Engine Types*

Type	*Brief Description*
1	▪ Most common fire truck in use today ▪ Typically responds to structural fires ▪ Usually transports up to 4 firefighters
2	▪ More common in rural areas ▪ May be used for structural fires, but also grass fires ▪ Usually transports up to 3-4 firefighters
3	▪ Wildland engine ▪ Has the ability to drive in rough terrain ▪ Common in rural areas
4	▪ Wildland engine ▪ Similar to Type 3, but smaller pump and less hose
5, 6, 7	▪ Typically pick-up truck-based with 4-wheel drive ▪ Used heavily for the initial fire suppression response

Based on the age and use of E257, the engine has become less reliable. As such, the likelihood of potential breakdowns or start failures increases. Such issues could impact response times which can impact the City's Insurance Services Office (ISO) score. In anticipation of replacing the engine, the Fire Department created an apparatus committee in February 2020 to research the various types fire engines that would best serve the community. The committee consisted of individuals of different ranks, knowledge, and expertise. The committee was tasked with conducting its own independent research and reporting their findings. The committee's recommendation culminates months of research, and the result will produce an apparatus that is tailored to suit the needs of the City. The committee met on numerous occasions to discuss features, technology, specifications, warranty, and service. Based on this research, the committee is recommending a Rosenbauer Type-1 Commander Custom Fire Apparatus.

It should be noted that Rosenbauer is the world's largest manufacturer of fire equipment with 11 manufacturing locations worldwide. In the US, there are locations in Minnesota, South Dakota, and Nebraska. Burton's Fire provides sales, warranty, and major services in Modesto. In addition, the City purchased engines from Rosenbauer 2002 and 2017. Purchasing a Rosenbauer engine will keep the standardization of apparatus and components consistent with what fire personnel

currently have in service, making training smooth, saving additional costs on a more in-depth training should a different fire engine manufacturer be selected.

Equipment Overview

The following tables highlight the City's existing and proposed fleet by station. Frontline engines are identified by the station number, whereas reserves are reassigned a number in the 200s. Engine 656 is a Type 6 engine, hence the 600 number. Existing E57 would be reassigned as E257 whereas the new engine would be E57.

Table 2: *Existing Equipment by Station*

Station	*Equipment*	*Type*	*Model Year*	*Status*
56	Engine 56	1	2016	Frontline
	Engine 656	6	2006	Frontline
	All-Terrain Vehicle (river access)	N/A	2019	Frontline
57	Engine 57	1	2008	Frontline
	Engine 257 (to be replaced)	1	1990	Reserve
58	Ladder Truck 58	1	2018	Frontline
	Engine 258	1	2002	Reserve

Table 3: *Proposed Equipment by Station*

Station	*Equipment*	*Type*	*Model Year*	*Status*
56	Engine 56	1	2016	Frontline
	Engine 656	6	2006	Frontline
	All-Terrain Vehicle (river access)	N/A	2019	Frontline
57	New Engine 57	1	2022	Frontline
	Engine 257 (former Engine 57)	1	2008	Reserve
58	Ladder Truck 58	1	2018	Frontline
	Engine 258	1	2002	Reserve

In addition to City use, engines are often used to provide mutual aid throughout the State. When resources are sent out on Statewide mutual aid assignments, the City is reimbursed the costs of staff and for the use of vehicles. Over the last five years, the City has received 24 four reimbursement checks equaling $187,728. As the fleet ages, it becomes more challenging to dispatch engines on mutual aid assignments.

Vendor Selection Process

The purchase may be made without the City soliciting formal bids because the basic specifications and corresponding purchase price have already been formally and competitively bid under a

cooperative purchasing contract through Sourcewell, a government agency/service cooperative created by the Minnesota State legislature as a local unit of government. The cooperative agreement allows the City to purchase the engine without independently negotiating new terms.

Status of 1990 Grumman Engine

Upon receipt, the City would auction existing E257. Often, former engines are sold to developing countries, for parts, or to fire engine enthusiast. While preserving historic fire engines honors the tradition and rich history of the City's fire department, the engine, while memorable, does not reflect a unique era in firefighting in terms of technology or design, and would occupy a lot of space. Moreover, with the anticipated acquisition of Engines 2 and 3 in January, space is limited for indoor storage.

FINANCIAL IMPACT:

In an effort to plan for the costs to replace vehicles, the City established a Motor Vehicle Replacement Fund that accumulates annual contributions based on a vehicle's set replacement value and estimated useful life. At the time, fire engines were not included in the program. As a result, staff created a fire engine replacement program in Fiscal Year 2019/20 using Measure K revenue. In creating the Engine Replacement Fund, the following assumptions were made:

- Frontline engines have an expected service life of 15 years
- The City has 3 fire stations, thus the City would need to purchase a new fire engine every 5 years
- Engines, fully equipped, cost approximately $1 million
- $200k from Measure K would be assigned annually

Similar to most assumptions, a recalibration may be necessary due to recent increases in cost at a future date.

Table 4: *Engine Replacement Fund (source: Measure K)*

Fiscal Year	*Amount*
2018/19*	$200k
2019/20	$200k
2020/21	$200k
2021/22	$200k
Total:	**$800k**
*City retroactively assigned unexpected additional revenue from Measure K in FY 18/19	

The base price of the engine is $774,907. However, should the City pre-pay, the cost is reduced to $751,460, a savings of $23,447. Staff is proposing that the City pre-pay using funds in the Fire Engine Replacement Fund.

Table 5: *Cost for new engine**		
Base Price	*If pre-paid*	*Equipment*
$774,907	$751,460	±$200k (not part of this request)
*Figures are rounded to nearest dollar		

While costly, citizens of Madera can rest assured that the staff does not take this purchase casually. Rather, staff has taken all necessary steps to obtain the most precise and accurate information to purchase the best product available. The initial attack engine is the workhorse of the fleet and one of the essential tools that the City employs. Above all, this apparatus will ensure lasting service to serve and safeguard the citizens, visitors, and properties the City is charged with protecting.

CONSISTENCY WITH THE VISION MADERA 2025 PLAN:

The purchase will be consistent with the Vision of Madera 2025 Plan. More specifically:

- *Strategy 421*: First Response Emergency Services: Ensure the safety and protection of Madera and its community members through adequate first response to emergencies. Maintain sufficient resources to expand protection as the community grows.

ALTERNATIVES:

As an alternative, Council may:

1. Request additional information on the cost, engine type, etc.
2. Defer making the purchase.
3. Deny the request.

ATTACHMENTS:

1. Photos of Engine 257
2. Examples of a Type 1 engine
3. Model of New Engine
4. Resolution
    a. Purchase Agreement
        i. Prepayment Agreement
        ii. Engine Specifications
        iii. Model of Engine
        iv. Center of Gravity Specifications
        v. Weight Specifications
    b. Budget Amendment

Attachment 1

Photos of Engine 257

Attachment 1: Photos of E257

Attachment 2

Examples of a Type 1

Engine

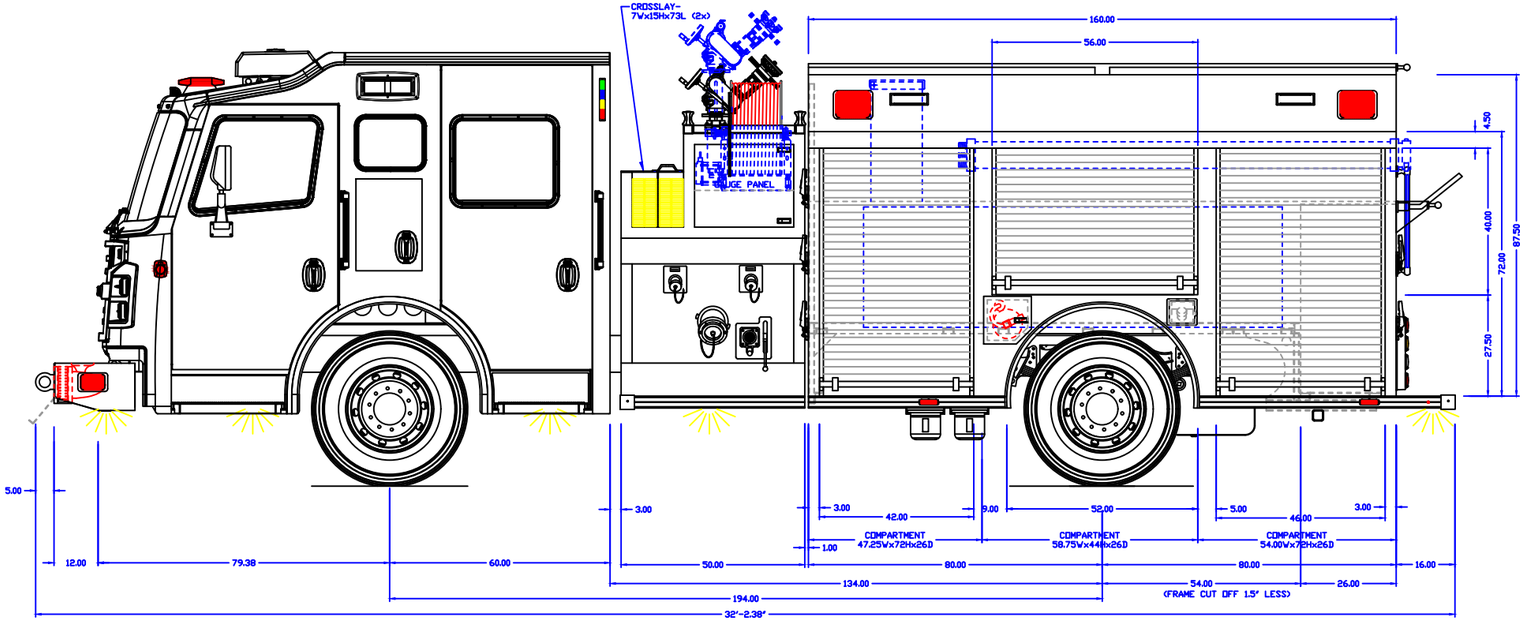
Attachment 2: Examples of a Type 1 Engine (illustrative only)

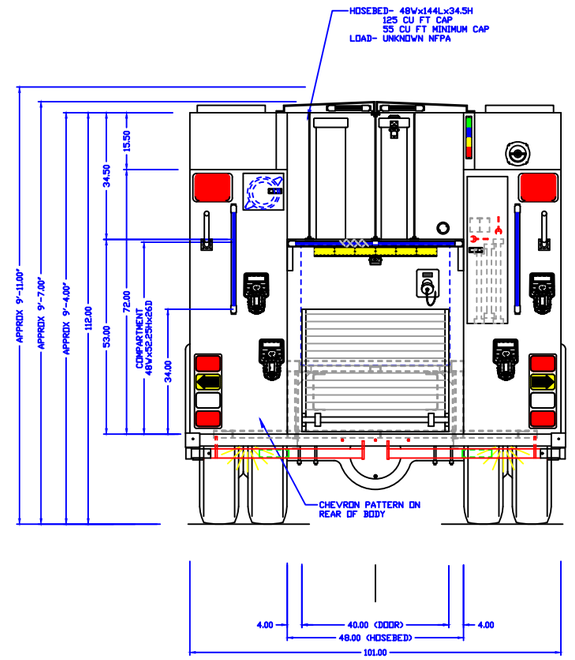
Attachment 3:

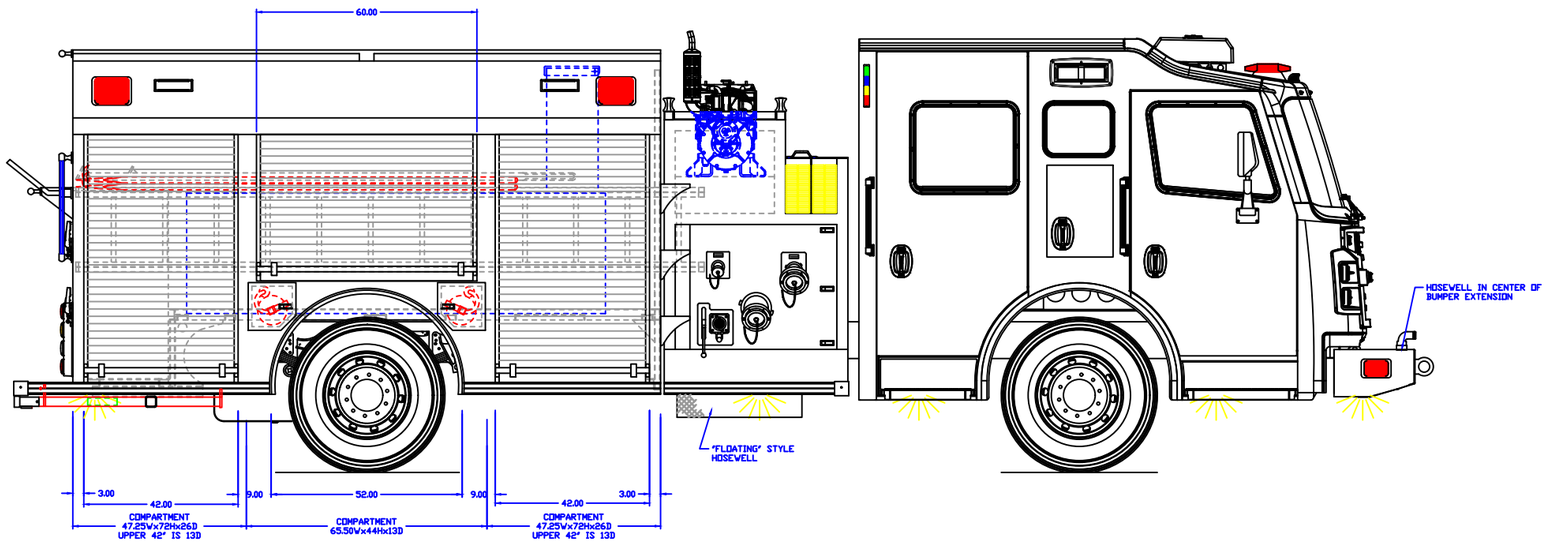
Model of Engine

Attachment 3, Model of Engine

NOTES:
1. OVERALL HEIGHT IS IN LOADED CONDITION. UNLOADED HEIGHTS MAY BE 4" ABOVE HEIGHTS SHOWN.
2. DO NOT SCALE DRAWING.
3. ALL DIMENSIONS ARE APPROXIMATE AND SUBJECT TO ENGINEERING CHANGES.
4. DRAWING MAY OR MAY NOT SHOW ALL ITEMS AS DESCRIBED IN THE WRITTEN DETAIL SPECIFICATIONS.
5. INCLUSION OF AN ITEM ON THE DRAWING DOES NOT CONSTITUTE INCLUSION OF THAT ITEM WITH THE FINAL DELIVERED UNIT.
6. THE EFFECTIVE DOOR OPENINGS WILL BE APPROX. 2" LESS THAN THE NOTED COMPARTMENT OPENING FOR ROLL UP DOORS AND UP TO APPROX. 4" LESS FOR HINGED DOORS







APPROVED BY:

CHASSIS:	COMMANDER 6011
PUMP:	ROSENBAUER 1500 GPM
TANK:	POLY/500/30(FOAM)
PANEL MATL:	LINE X
COMP INTERIOR:	LINE X
MAXIMUM HEIGHT	NONE
MAXIMUM LENGTH	NONE
BODY WIDTH	101"

REVISED:	WLM	DATE: 06-18-21
DRAWN:	WLM	DATE: 04-29-20

MADERA CITY FIRE DEPT., CA

ROSENBAUER FX 1/8"

DRAWING NUMBER: madera city, ca2

REV: -

Attachment 3

Resolution

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MADERA APPROVING A PURCHASE AGREEMENT FOR A ROSENBAUER TYPE-1 FIRE ENGINE FROM ROSENBAUER SOUTH DAKOTA, LLC A SOURCEWELL COOPERATIVE PURCHASE CONTRACT #022848-RSB; AUTHORIZING EXECUTION BY CITY MANAGER; AND AMENDING THE 2021/22 ADOPTED BUDGET APPROPRIATING $751,549.74 FOR THE PURCHASE IN THE MEASURE K FIRE BUDGET FOR THE PURCHASE OF EQUIPMENT

WHEREAS, the City has determined that it is prudent to purchase a new fire engine to replace Engine 257, a 1990 Grumman that is 32 years old; and

WHEREAS, the purchase of a new engine will help ensure lasting service to serve and safeguard the citizens, visitors, and properties the City is charged with protecting; and

WHEREAS, staff conducted exhaustive research to ensure that the new engine meets the needs of the community and that staff has taken all necessary steps to obtain the most precise and accurate information to purchase the best product available; and

WHEREAS, staff has identified a Rosenbauer Type-1 Commander Custom Fire Apparatus as the best option; and

WHEREAS, the purchase can be made without the City soliciting formal bids because the basic specifications and corresponding purchase price have already been formally and competitively bid under a cooperative purchasing contract through Sourcewell, a government agency/service cooperative created by the Minnesota State legislature as a local unit of government. The cooperative agreement allows the City to purchase the engine without independently negotiating new terms; and

WHEREAS, the City created a Fire Engine Replacement Fund using Measure K revenue in Fiscal Year 2019/20; and

WHEREAS, the Fire Engine Replacement Fund will have accumulated $800,000 by Fiscal Year 2021/22; and

WHEREAS, the City Council previously adopted a City-wide budget for the 2021/22 fiscal year; and

WHEREAS, the City has determined that it is prudent to purchase a Type 1 engine at a cost of $751,549.74; and

WHEREAS, the City has determined to pre-pay for the delivery of the engine which reflects a savings of approximately $23,447; and

WHEREAS, an adequate fund balance is available in the Fire Engine Replacement Fund to allow for said increase of appropriations.

NOW THEREFORE, the City Council of the City of Madera hereby finds orders and resolves as follows:

1. The above recitals are true and correct.
2. The Purchase Agreement for a Rosenbauer Type-1 Fire Engine from Rosenbauer South Dakota, LLC under Sourcewell Cooperative Purchase Contract #022848-RSB is approved attached hereto as Exhibit A is approved.
3. The budget of the affected Measure K Fire Fund is hereby amended to include the appropriate changes shown in Exhibit B to this resolution which is incorporated by reference.
4. The City Manager is authorized to execute the Purchase Agreement.
5. A signed copy of this resolution shall be placed on file in the Office of the Director of Finance who shall prepare entries necessary to reflect budget changes identified in the City's accounting system.
6. This resolution is effective immediately upon adoption.

* * *

Exhibit A: Purchase Agreement

PURCHASE ORDER

Purchaser			SUPPLIER	
Purchaser:	City of Madera		**Contract #**	Sourcewell Contract #: 022818-RSB
Address 1:	1030 S. Gateway Drive		**Supplier:**	Rosenbauer South Dakota, LLC
Address 2:			**Address 1:**	100 3rd Street
City, State, Zip:	Madera, CA 93637-4728		**Address 2:**	
			City, State, Zip:	Lyons, SD 57041

Purchase Order Number:	TBD	**Delivery in Calendar Days:**	395
Date:	11/3/2021	**Member #**	27811

Quantity	Description	Price	Price (Extended)
1	One (1) Rosenbauer Pumper, complete with Rosenbauer Commander chassis per attached specifications.	$751,459.74	$751,459.74
Please note: this contract includes a 100% pre-pay deduction payable within 30 days after receipt of order.			
The contract/purchase order price includes sales tax in the amount of $56,967.74.			
TOTAL			$751,459.74

NOTES:	This Purchase Agreement is subject to the terms and conditions in (1) Sourcewell Contract # 022818-RSB include Form E Contract Acceptance and Award and (2) Madera City Fire Department, 1500 GPM Type-1 Engine FX, FX Engine with a Commander Custom Chassis. Said specifications are attached to this Purchase Agreement. Additionally the Insurance requirements and the inspection and acceptance provisions in the Sourcewell Contract are expressly made a part of the Purchase

Rosenbauer Dealer :	Burton's Fire Inc.
Salesperson:	Kenneth Howenstine
Signature:	Kenneth D. Howenstine Typed text here

Purchaser:	City of Madera
Print Name:	
Title:	
Date	
Signature:	

APPENDIX A
CHANGE ORDER POLICY

This change order policy is intended to reflect the increased cost of changes which result in delayed deliveries, confused paperwork, poor production flow and increased potential of trucks being built to incorrect specifications. With your cooperation, changes can be kept to a minimum which means we will be able to reduce lead times, increase production and maintain costs which will benefit all of us.

Our objective is accurate, high quality and on-time deliveries exceeding our customer expectations.

Changes any time after the order is received may delay the quoted delivery date. Significate design or component changes will have the largest impact on the schedule and quoted delivery date. Changes that occur later in the process will also have the largest impact on the schedule and quoted delivery date.

All time fences are reference to contract execution date if not otherwise stated.

Change Window #1
All changes will be priced at standard pricing and specials will be priced through our normal process. Significant changes made to the vehicle during this time period may result in a delivery extension.

RBM Chassis	0-60 days
RBA Aerial	0-60 days
Rosenbauer Body	0-60 days

Change Window #2
All changes are subject to a 25% mark-up, as well as a $250.00 change order processing fee. All changes are subject to factory review and may be denied due to engineering or lead time issues.

RBM Chassis	61-75 days
RBA Aerial	61-75 days
Rosenbauer Body	61-120 days

Change Window #3
All changes are subject to a 50% mark-up, and 50% restocking fee on deleted items, as well as a $250.00 change order processing fee. All changes are subject to factory review and may be denied due to engineering or lead time issues. No major components can be changed at this time; major components are considered engine, transmission, axles, suspension, cab, frame (wheelbase), seats, water pump and water tank.

RBM Chassis	76-120 days
RBA Aerial	76-120 days
Rosenbauer Body	121-180 days

Change Window #4
Changes are not recommended at this time. Any changes requested will be priced on a time and material basis, as well as a $500.00 change order processing fee. Any changes requested, and that are quoted to the customer, must be approved by the customer within three days or they will not be valid.

RBM Chassis	After 120 days
RBA Aerial	After 120 days
Rosenbauer Body	After 180 days

**Note: Any late change orders that are factory driven will be done at cost and no additional mark up or penalties will apply.*

BUYER INITIALS: _____

Attachment 1 of Exhibit A: Prepayment Discount

October 20,2021

Madera City FD
200 W. 4th Street
Madera, Ca 93637

Sourcewell Formerly NJPA
Awarded Contract

Member Number: 27811

Chief Watson

Thank you for the opportunity to propose the following piece of Rosenbauer custom fire apparatus:

One (1) Type-1 Engine with Commander Custom Chassis

	Base Price	100% Pre-Pay
Body Price	$400,032.00	$390,132.00
Chassis Price	$312,146.00	$300,386.00
Delivery	$3,974.00	$3,974.00
Ca State Sales Tax	$58,754.69	$56,967.74
8.250%	$774,906.69	$751,459.74

Please note: Pre-Con for (3) from Dept. at Factory
Mid-Point Inspection for (3) from Dept. at Factory
Final Inspection for (3) from Dept. at Factory
Final Delivery will be made by the Burton's Fire to the Dept.
Performance Bond Not Required
Quoted Delivery is 395 days after receipt of order
(1) Day of Familiarizaition training by Burton's

Terms:

Final payment due upon 30 days after contract acceptance
Pricing as quoted above is valid for 60 days.

Thank you again for this opportunity to work with your department, if you have any questions regarding the above proposal, please contact me at (209) 609-2542 or at howenstine@burtonsfire.com

Sincerely,

Ken Howenstine
Burton's Fire Inc.

Burton's Fire Inc.
1301 Doker Drive
Modesto, CA 95351
209-544-3161
209-544-1109 Fax
www.burtonsfire.com

South Dakota Division
100 Third Street
Lyons, SD 57041
605-543-5591
605-543-9701 Fax
E-mail: sales@rosenbaueramerica.com

Minnesota Division
5181 260th Street
P.O. Box 549
Wyoming, MN 55092
651-462-1000
651-462-1700 Fax
E-mail: sales@rosenbaueramerica.com

Aerial Division
870 South Broad Street
Fremont, NE 68025
402-721-7622
402-721-7622 Fax
E-mail: sales@rosenbaueramerica.com

Attachment 2 of Exhibit A: Engine Specifications

rosenbauer
Firefighting Technology

Madera City Fire Department

1500 GPM Type-1 Engine FX Engine with a Commander Custom Chassis

Table of Contents

MEASUREMENTS

OVERALL HEIGHT

An overall height restriction has not been specified for this apparatus.

OVERALL LENGTH

An overall length restriction has not been specified for this apparatus.

OVERALL WIDTH

An overall width restriction has not been specified for this apparatus.

WHEELBASE

A wheelbase restriction has not been specified for this apparatus.

ANGLE OF APPROACH

The angle of approach for the apparatus shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

ANGLE OF DEPARTURE

The angle of departure for the apparatus shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.
NFPA Equipment Allowances

NFPA PUMPER EQUIPMENT ALLOWANCE

In compliance with NFPA #1901 standards, the apparatus shall be engineered to provide an allow of 2500 pounds of fire department provided loose equipment.

CHASSIS SPECIFICATION

CAB CUSTOM STYLE

The cab shall be a custom, cab over engine style, with the driver and officer positions ahead of the engine and front axle. The cab shall be specifically designed and manufactured for the fire service industry.

The cab shall be designed by manufacturer's Engineering to meet the unique, Heavy-duty construction specifications. The raw cab will be fabricated to meet the exacting demand of the fire industry and shall be manufactured by a company with no less than 50 years of experience in building custom cabs. All aspects of the cab will be quality checked by manufacturer's personnel. All cab and chassis customization and assembly will take place on the manufacturer's premises.
The cab shall be of a totally enclosed full tilt design, with the interior area completely open to improve visibility and verbal communication between the occupants. The cab shall be capable of tilting 45-degrees, allowing the chassis engine to be removed, if required, without tilting the cab beyond 45-degrees. No Exceptions.

The cab shall include a four (4)-point rubber isolated cab pivot and mounting system. The rear histic mounts shall be isolated from the chassis frame to reduce the transfer of road vibrations and frame torque into the cab, while providing superior handling characteristics. No solid mounted rear lock downs shall be acceptable. No Exceptions.

The front cab pivot assemblies shall be 1/2" A36 steel plate with a .31" thick 2-1/2" diameter tube cross member mechanically attached to the cab and frame. There shall be two (2) greaseable rubber isolated engineered bushings to reduce the transfer of road vibrations into the cab.

The cab shall be locked down by a two (2)-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The cab super-structure shall be designed with high strength 6061-T6 Aluminum extrusions and 3/16" 5052-H32 Aluminum plate. This shall include the "A", "B", "C" and "D" extruded pillars, triple wall front end reinforced by 3/16" thick x 2"x3" extrusion tubes, 3/16" side walls and rear wall. This shall offer superior occupant protection in the event of vehicle impact.

The extrusions shall provide adequate space for routing of wiring and hoses which will provide service accessibility. Routing of harnessing which requires pulling of wires through tubes will not be allowed. No Exceptions.

The "A" pillar shall be of a closed section, one-piece extrusion extending from the cab header to the bottom of the cab. This design shall ensure strength and superior resistance to buckling in the event of a frontal impact.

The cabs front corners shall be constructed of 5052-H32 stamped Aluminum to provide a consistent material composition. The stamping process alleviates the high tendency of fractures through the fusing of dissimilar metal composition as appears with a casting process.

Cast cab components, including cab corners, "A" pillars and front fascia components shall not be acceptable due to the high tendency of fractures. No Exceptions.

Additional cab strength shall be obtained through closed section, dual extrusions in the construction of the "D" pillars.

The front façade shall be constructed with dual wall .19" thick 5052-H32 Aluminum plates which make up the front bulkhead, reinforced by .19" thick 6061-T6 Aluminum extrusion (box-sections), though-out the inner and outer perimeter of the front end / façade. The reinforcing third wall / barrier is .13" thick 5052-H32 work hardened Aluminum façade panels. All panels shall be welded, no adhesive.

The cab side wall of the cab shall be 3/16" thick 5052-H32 Aluminum plate. The cab side plate shall wrap the corner of the cab b pillar and slam post. The cab rear wall plates shall be reinforced with a minimum of two (2) 3/16 x 3" Aluminum sections; the cab side reinforcements shall be a minimum of 28" apart and span from the cab B pillar and cab C pillar.

The rear wall of the cab shall be 3/16" thick 5052-H32 Aluminum plate. The rear cab plate shall wrap the corner of the cab and attach to the cab D pillar and slam post. The cab rear wall plates shall be reinforced with four horizontal and dual vertical support sections; the dual vertical support structure shall consist of 1/8" thick x 2" 6061-T6 Aluminum tubes and the horizontal hat sections shall consist of 1/8" thick x 4" 5052-H32 Aluminum. The dual vertical support sections shall be 40" a-part, and the cab shall contain a minimum of four (4) 4" hat section horizontal supports.

Additionally, the rear edge of the floor shall include a 3/16" 6061-T6 Aluminum tube extrusion (under the floor) and a 7" 5052-H32 Aluminum cab floor support section (above the floor)

The outside cab width shall measure 99" across. The interior cab shall have a width of 93".

The cab length shall measure 77.3" from the center of the front axle to the front cab skin and 60" from center of the front axle to the back of the cab, for a total cab length of 137.3".

The cab shall also feature ample driver and officer foot room, a total of 3.7 square feet for the driver and 4.45 square feet of floor space at the officer's feet. (No exceptions)

The crew floor shall feature a complete flat floor design, including provisions for a one o'clock PTO inclusion, while still offering an uninterrupted 25 total square feet of space.

The leading edge of the cab floor from the steps shall meet NFPA 15.7.4 slip resistance requirements on both the front and rear cab doors. No Exceptions.

The cab shall meet or exceed cab impact test (SAE J-2420, cab rollover test (SAE J2422), and cab seating requirements (FMVSS 210, and FMVSS 208).

The cab shall include 4 doors. They shall have a front two (2) cab doors shall have a minimum clear opening of 42.5" wide by 81" high measured from the top of the lower cab step to the top of the door opening.; and the rear two (2) crew doors shall be a minimum clear door opening of 38.5" wide by 91.5" high measured from the top of the lower cab step to the top of the door opening. The length of the door will vary depending on door type.

ROOF STYLE - 11" RAISED

The cab roof design shall incorporate an angled front roof, transitioning into a rolled extrusion for a swept back design.

The roof height shall feature an 11" raise starting over the driver and officer positions and continuing back to the roof and rear wall joint. Raised roof designs that do not include a raised portion over the driver and officer positions will not be acceptable. No Exceptions.

The roof of the cab shall feature dual .25" thick interlocked structural member extrusions running the entire width of the cab defending against buckling in the event of a rollover.

The cab header shall feature dual 6061-T6 Aluminum extrusions which shall offer superior rigidity and strength.

The raised roof shall offer a crew head height area of 66-1/2" from the floor to the ceiling in the crew areas for optimum headroom.

The crew roof super structure shall include a reinforcement hat-section structure 1/8" thick 5052-H32 Aluminum bracing. The for-aft support braces will be 24" on center apart, the side to side support braces will stretch from cab side to cab side and centered between the dual 3/16" extruded and plate reinforced roll-cage section.

The forward cab roof section shall include a combination of 1/8” 6061-T6 extruded tube reinforcements and a hat-section structure 1/8” thick 5052-H32 Aluminum bracing. The bracing shall wrap the entire perimeter of the cab forward roof, and the condenser support structure.

The condenser support structure shall include 1/8” triple sections, supporting the outer perimeter and center of the condenser mounting pad.

Additionally, the entire roof super structure is reinforced by a .25” thick roof edge corner extrusion around the entire cab perimeter.

A drip rail shall be provided along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

DRIVER SIDE EMS COMPARTMENT

The driver side of the cab shall feature a compartment which is designed for housing emergency medical equipment. The compartment shall be located immediately behind the driver's seat and the interior shall measure 23"wide x 26" tall x 24" deep. The rear inboard corner of the cabinet shall be angled at 45 degrees which will decrease the depth on the rear facing the wall from 24" to 17".

1. The compartment shall feature an opening on the exterior and/or interior of the cab.
2. The compartment shall have a minimum of 7.5 cubic feet of storage. No Exceptions

EMS COMPARTMNET LIP

The top of the EMS compartment shall have a 2.0-inch-high aluminum lip around the entire perimeter.

DRIVER SIDE EMS COMPARTMENT – Exterior Hinged Door

The EMS compartment shall feature:

- A hinged box pan style exterior compartment door
- A hidden, piano style Stainless-steel door hinge which shall be mounted inside the panel of the door prohibiting dirt and debris from becoming trapped in the hinge.
- A clear door opening of approximately 17.5" wide x approximately 25.5" tall
- The door shall open as far as possible without contacting the side of the cab or interfere with the opening or closing of the officer’s door.
- The compartment floor shall be a sweep out design

EMS COMPARTMENT HANDLE

The EMS compartment handle shall be a die cast steel, black door handle.

EMS COMPARTMENT LOCKS

The door handle shall include a power door lock, which are unlocked with the cab power door locks.

INTERIOR DRIVER EMS COMPARTMENT ACCESS

- The interior driver's EMS compartment shall have an opening of 11.75" W x 20.5" H. The compartment shall have a lip along the bottom.

EMS COMPARTMENT INTERIOR ACCESS

The driver EMS compartment shall feature interior access through a hinged door towards the rear of the cab.

HINGE LOCATION

The driver's interior EMS compartment hinged door shall have the hinge located on the outboard side of the compartment. (Near the Cab Exterior)

Hinge to be located by the cab exterior

DRIVER EMS COMPARTMENT INTERIOR FINISH

The interior of the driver side EMS compartment shall be finished with the same product and color as the cab coating.

DRIVER EMS CAB COMPARTMENT LIGHTING

The driver's side EMS compartment shall include one (1) 18" strip of LED lighting and shall be located in the inside front corner of the compartment near the door.

OFFICER SIDE EMS COMPARTMENT

The officer side of the cab shall feature a compartment which is designed for housing emergency medical equipment. The compartment shall be located immediately behind the officer's seat and the interior shall measure 18.5" wide x 26" tall x 23" deep. The rear inboard corner of the cabinet shall be angled at 45 degrees which will decrease the depth on the rear facing the wall from 23" to 16".

- The compartment shall feature an opening on the exterior and/or interior of the cab.
- The compartment shall have less than of 7 cubic feet of storage. No Exceptions

EMS COMPARTMNET LIP

The top of the EMS compartment shall have a 2.0-inch-high aluminum lip around the entire perimeter.

OFFICER SIDE EMS COMPARTMENT – Exterior Hinged Door

The EMS compartment shall feature:

- A hinged box pan style exterior compartment door
- A hidden, piano style Stainless-steel door hinge which shall be mounted inside the panel of the door prohibiting dirt and debris from becoming trapped in the hinge.
- A clear door opening of approximately 14.5" wide x approximately 25.5" tall
- The door shall open as far as possible without contacting the side of the cab or interfere with the opening or closing of the officer's door.
- The compartment floor shall be a sweep out design

EMS COMPARTMENT HANDLE

The EMS compartment handle shall be a die cast steel, black door handle.

EMS COMPARTMENT LOCKS

The door handle shall include a power door lock, which may be unlocked through a switch on the cab or with the cab power door locks.

INTERIOR OFFICER EMS COMPARTMENT ACCESS

The interior officer's EMS compartment shall have an open 11.75" W x 20.5" H. The compartment shall have a lip along the bottom.

EMS COMPARTMENT INTERIOR ACCESS

The officer EMS compartment shall feature interior access through a hinged door towards the rear of the cab.

HINGE LOCATION

The officer's interior EMS compartment hinged door shall have the hinge located on the outboard side of the compartment. (Near the Cab Exterior)

Hinge to be located by the Cab Exterior

OFFICER EMS COMPARTMENT INTERIOR FINISH

The interior of the officer side EMS compartment shall be finished with the same product and color as the cab coating.

OFFICER EMS CAB COMPARTMENT LIGHTING

The officer's side EMS compartment shall include one (1) 18" strip of LED lighting and shall be located in the inside front corner of the compartment near the door.
Stainless Steel Black

CAB STEPS

The cab steps shall meet NFPA 13-7.3 in size and slip resistance requirements.

The cab shall incorporate a two-step design at each door, with a first step height of approximately 22” from the ground. The leading edge of the first step shall be 5" further outboard than the second step to provide a staircase design for safer egress.

The front cab first step shall measure a minimum of 33" wide x 10" deep. The front cab intermediate step shall measure a minimum 31" wide x 8" deep.

The crew cab first step shall measure a minimum of 26" wide x 10" deep. The crew cab intermediate step shall measure a minimum 28" wide x 9" deep.

The top crew step shall incorporate an angle approximately midway from the rear wall to the crew door hinge extending out the flooring under the rear facing outer seat positions, offering foot placement for safety while seated in this position.

CAB STEP TRIM

The cab steps shall include a .80 gauge stainless steel construction on the first step, the step closest to the ground. The stainless steel finish shall be a number 7 mirror. The step shall include a frame which is integral with the construction of the cab for rigidity and strength. The Round Hole pattern shall allow water and other debris to flow through rather than becoming packed under the step. The middle step shall be integral with the cab in construction and shall be trimmed in 3003-H22 embossed aluminum tread plate which is 0.100" thick.

Both lower and middle steps shall be black.

CAB DOORS

The cab shall include a total of four (4) doors, two (2) forward and two (2) rear crew doors.

The forward cab doors shall be a minimum of 45" wide, and have a cab structure opening of 42.5" wide; and the rear crew doors shall be a minimum of 41" wide, and a cab structure opening of 38.5" wide to provide enhanced entry and egress of the cab.

Each cab door shall feature:

- Superior strength and rigidity from 3/16" closed section extruded door frames
- Damping inside each door for a solid feel and minimized reverberation when closed
- A rolled rubber bulb seal style gasket shall be utilized around the door ensuring a weather tight fit
- Integrated, mechanical door stop
- A full length, hidden piano style 10 gauge stainless steel door hinge with a 1/4" pin, which shall be mounted inside the panel of the door prohibiting dirt and debris from becoming trapped in the hinge
- An integrated one-piece inner door assembly that includes a glass track, mounting provisions for window regulator, door handle and door panel shall be utilized. The inner door assembly shall be easily removed with nut inserts. Self-tapping screws shall not be acceptable.

BARRIER FREE DOORS

The cab doors shall be "barrier free" style, meaning the door shall be constructed to cover the entry down to the intermediate step, leaving the bottom step open. Each door shall provide approximately 33" of clearance from the ground to the bottom of the door so the door may be opened without stopping due to guard rails along highways.

The lower step well of the cab shall be painted job to match the lower primary color of the cab.

CAB STEP TRIM KICKPLATE

The cab step risers at all doors, the vertical section of all steps, shall include an aluminum tread plate with Black Line-X finish.

CAB DOOR INSULATION

The cab doors shall have insulation installed on the interior of the door skin in the areas that will not interfere operation of any of the door components.

DOOR HANDLES

The exterior door handles shall be constructed of die-cast steel. They shall feature heavy duty pull style handles which are extended out and suitable for easy grasping with a gloved hand.

The handles shall be complimentary to the cab exterior and shall be black in color.

The interior door handle shall be a paddle style which shall be chrome in color. The paddle shall be hinged towards the rear of the cab.

CAB DOOR LOCKS

All cab doors shall include power and manual door locks with keys. The door lock shall include a manual toggle and shall be an integral part of the interior door handle which is red in color. The exterior door lock is integral with the door latch. The cab doors may be unlocked from the exterior with a key or through a thumb turn from inside the cab.

POWER DOOR LOCK OPERATION

Each powered door lock shall be activated by a switch on the Driver and Officer interior front grab handle; which shall control all of the powered cab entry door locks.

POWER DOOR LOCK ACTIVATION

The power entry door locks shall include an electronic door lock system which shall include a switch on the inside of each front cab door and two external keypads. The external key pads shall be located near the driver's side front door and near the officer's front door.

The power entry door locks shall include two key fobs for activation of the power door locks.

INTERIOR CAB DOORS

All cab doors shall consist of a one-piece formed and stamped aluminum interior panel. The panel shall include a formed collar around the interior door latch. The door panels shall be attached to the door with nutserts. ABS material shall not be acceptable. No Exceptions.

INTERIOR CAB DOOR FINISH

All cab doors shall be finished with Line-X bed liner coating for durability. The finish shall be black in color.

INTERIOR FRONT DOOR PULL

The interior driver and officer cab doors shall each include one (1) customized cast Aluminum single piece door grab pull designed specifically for the fire service.

The single piece door pull shall have a curved designed in an “L” formation to provide multiple points for grasping with a gloved hand. The horizontal dimension shall be a minimum of 28" and the vertical dimension shall be a minimum of 20". The door pulls shall have an ergonomic curve making them easier to grasp when entering and exiting the cab. No Exceptions.

The door pull shall feature secure mounting in three separate locations of the pull utilizing Stainless-steel fasteners with nut inserts in each location. Self-tapping screws or other mounting techniques shall not be allowed for interior door pulls or grab handles.

Each handle shall be constructed of A356 Aluminum casting and shall feature a black powder coated finish.

INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast Aluminum grab handle shall be provided on the inside of each rear crew door. The handle shall extend horizontally the width of the window just above the windowsill. The handle shall assist with entry and egress from the crew area of the vehicle.

The interior driver and officer rear cab crew doors shall include one (1) customized cast Aluminum single piece door grab pull designed specifically for the fire service.

The door pull shall have an ergonomic curve making them easier to grasp when entering and exiting the cab. No Exceptions.

The door pull shall feature secure mounting with Stainless-steel fasteners with nut inserts in each location. Self-tapping screws or other mounting techniques shall not be allowed for interior door pulls or grab handles.

Each handle shall be constructed of A356 Aluminum casting and shall feature a black powder coated finish.

GRAB HANDLES "A" PILLAR

There shall be two (2) additional molded 9.00” rubberized grab handle shall be installed inside the front cab doors. The handles shall be located one on the Driver’s side A Pillar and one on the officer's side on the A Pillar.

WINDSHIELD

A one (1)-piece, safety glass full width windshield with more than 3,228 square inches of area will be provided. No Exceptions.

The windshield shall feature:

- A completely uninterrupted view from both the driver and officer positions
- The windshield will consist of three (3) layers; the outer layer, the middle safety laminate, and the inner layer. The .114" thick outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage.
- Economical replacement readily available from auto glass supplier
- Easily removable for replacement using standard automotive techniques
- A frit band will be provided along with an outer trim seal on the outside perimeter of the windshield for a finished automotive appearance.

WINDSHIELD WIPER SYSTEM

A single windshield wiper system shall be incorporated in conformance with FMVSS and SAE requirements. Two (2) 22" windshield wiper arms shall be mounted below the windshield. Each arm shall include a 26" long wiper to provide optimum windshield clearing.

The windshield wiper fluid reservoir can be filled without raising the cab.

WINDSHIELD WIPER ACTIVATION

The windshield wipers shall be activated through a switch on the driver's panel, with intermittent control.

DRIVER WINDOW

The driver's door shall include a window which measures a minimum of 23.5" wide x 29" high, measured from the midpoints left to right and top to bottom. The window shall have a minimum

clear viewing area of 681 square inches. The glass shall include a light gray tint and through a powered operation shall completely roll into the door housing.

The window shall be trimmed in a black anodized aluminum ring and rubber seal to keep water from entering the cab when closed.

POWER WINDOW SWITCHES

The Driver shall have switches for each of the cab door windows. The powered windows of the officer door, and each respective crew door, shall be activated by a switch on the respective door.

The switches for the driver and officer door windows shall be located in a customized door grab handle. No Exception

OFFICER WINDOW

The officer's door shall include a window which measures a minimum of 23.5" wide x 29" high, measured from the midpoints left to right and top to bottom. The window shall have a minimum clear viewing area of 681 square inches. The glass shall include a light gray tint and through a powered operation shall completely roll into the door housing.

The window shall be trimmed in a black anodized aluminum ring and rubber seal to keep water from entering the cab when closed.

REAR DRIVER SIDE WINDOW

The rear driver's side door shall include a window which is 22.5" wide x 27" high, measured from the midpoints left to right and top to bottom. The window shall have a minimum clear viewing area of 607 square inches. The glass shall include a 5% dark tint which will block 95% of light coming through the glass and through a powered operation shall completely roll into the door housing.

Dealer/Fire Department to check with State Law Regarding Acceptable Tint Levels

REAR OFFICER SIDE WINDOW

The rear officer's side crew door shall include a window measuring 22.5" wide x 27" high, measured from the midpoints left to right and top to bottom. The window shall have a minimum clear viewing area of 607 square inches. The glass shall include a 5% dark tint which will block 95% of light coming through the glass and through a powered operation shall completely roll into the door housing.

Dealer/Fire Department to check with State Law Regarding Acceptable Tint Levels

DRIVER MIDDLE WINDOW

The cab shall include a fixed driver's side window glass which shall be located between the cab front and rear doors. The frited glass shall have a clear viewing area of 15.5" wide x 10.5" high and shall include a 5% dark tint which will block 95% of light coming through the glass. To eliminate the possibility of corrosion rubber gasket rings shall not be used in the installation of the window, the window shall be glued in.

Dealer/Fire Department to check with State Law Regarding acceptable Tint Levels

OFFICER MIDDLE WINDOW

The cab shall include a fixed officer's side window glass which shall be located between the cab front and rear doors. The frited glass shall have a clear viewing area of 15.5" wide x 10.5" high and shall include a 5% dark tint which will block 95% of light coming through the glass. To eliminate the possibility of corrosion rubber gasket rings shall not be used in the installation of the window, the window shall be glued in.

Dealer/Fire Department to check with State Law Regarding acceptable Tint Levels

CAB INSULATION

The cab shall be insulated from road and vehicle resonance, exterior sound and thermal intrusion. The cab insulation system shall be comprised of three separate components each designed to assure optimal thermal and acoustic properties are achieved. Two layers of insulation material shall be utilized.

A minimum of .8” of SCbond Polyurethane Foam insulation shall be applied as an additional insulation between the cab skin and all interior ceiling surfaces. The insulation shall have a density of 10 lb/ft3 +/-.5 providing better thermal properties and acoustic reduction properties.

A layer of 1/8” barrier bubble film laminated between two layers of reflective metalized film shall be provided in the roof to minimize the effects of radiant heat. The barrier shall be mold and mildew resistant and have a Class A/Class 1 fire rating. The barrier shall have a minimum of a R-5.6 rating. No Exception

The interior cab insulation system shall meet NFPA 1901 14.1.6 standards and ensure that no seated position within the cab exceeds 90dB. This decibel rating shall be measured with the apparatus traveling 45 mph with climate control settings off.

All insulation used in the construction of the cab shall be marine grade featuring longevity and resistance to degradation.

The interior of the cab including the rear wall, side walls and ceiling panels shall be insulated.

Use of open cell material as the primary insulation will not be acceptable. No exceptions.

ENGINE TUNNEL INSULATION

The engine tunnel shall include an insulated barrier from noise on the underside of each tunnel surface. This barrier shall be engineered for surrounding engines.

The insulation barrier shall provide an acceptable decibel level within the cab meeting or exceeding the recommendations of NFPA 1901.

The thickness of the engine tunnel insulation shall be 1" thick. The insulating material shall be open cell polyether based foam with a textured surface, specifically designed for acoustic absorption.

Use of aluminized faced material on the engine tunnel shall not be acceptable. No exceptions.

The engine tunnel insulation shall be precisely cut and sealed to fit each segment on the underside of the tunnel surface. The insulation shall then be affixed by a pressure sensitive adhesive.

The insulation shall meet or exceed FMVSS 302 flammability testing.

CAB UNDERBODY INSULATION

The underside of the cab shall include at a minimum of 1" of a uni-seal Cab-Foam insulation offering reducing vibration noise and thermal effect to the interior of the cab.

DAMPING INSULATION

The entire cab, including the ceiling and walls shall include additional insulation reducing structure borne noise from vibration, impact and resonance within the cab.

INTERIOR TRIM MATERIAL

The interior trim shall feature a 31 oz. marine grade vinyl which features a tensile strength of ASTM D751 of excellent, tear strength meeting the Federal standard 191-5134 of excellent and shall be oil resistant passing the CID-A-A-2950A requirement for no permeation.

Due to the excellent qualities of the marine grade vinyl material, no other type of interior trim shall be acceptable. No Exceptions.

The soft trim vinyl shall feature mildew resistance passing ASTM G21-90 and shall be rated to -25 degrees Fahrenheit.

The vinyl shall be flame retardant meeting California Fire Code 117, UFAC Class 1, and BIFMA Class 1 and shall have a high resistance to abrasion.

The interior of the cab including the ceiling panels shall feature this soft trim and shall be black in color.

REAR WALL INTERIOR MATERIAL

The rear wall of the cab shall be Line-X coated aluminum for a durable finish. The color shall be black.

PAC TRAC ON BACK WALL OF CAB

The rear wall outboard of the forward facing seats shall have 7000 Series Pac Trac provided on the interior for the purpose of mounting equipment. The Pac Trac shall start approximately 15.00" from floor and extend to the ceiling. The Pac Trac 3-Section Z-Mount brackets shall be used for in the installation.

Equipment brackets to be attached to the Pac Trac shall be provided by the purchaser.

THROTTLE AND BRAKE PEDALS

The apparatus shall have suspended throttle and brake pedals.

FLOOR MAT

The interior flooring of the cab shall be covered with an advanced black multi-layer acoustic dampening mat. The floor matting shall be an open/closed cell, flexible polyurethane polyamide material with frictional dampening and dissipation properties. The mat shall be a fire and skid resistant non-wicking material.

SUN VISORS

The driver and officer seats shall feature a sun visor mounted in the header over each seating position. The sun visors shall be padded and trimmed in black vinyl.
Cab Coating Interior Color

INTERIOR CAB FINISH

The interior cab shall be finished in Line-X bed liner coating including the interior A, B, C and D pillars, all occupant seat frames and any surrounding surfaces extending to the ball seal around each door. This type of coating shall feature:

- Durability, scratch, chemical and abrasion resistance
- Consistent, even coverage and a uniform texture
- Resistance from fading from exposure to UV light
- Black in color

ENGINE TUNNEL

The distance from the back of the tunnel to the interior wall shall be 54" measured at floor level and 60" at top of engine tunnel. No Exception.

ENGINE TUNNEL

The engine tunnel shall be constructed of aluminum offering superior durability in addition to thermal and acoustic resistance. Covering the engine tunnel shall be a layer of formed composite material for a contoured transition into the dash and offering a pleasing appearance.

The engine tunnel shall feature:

- A low-profile design measuring approximately 46.5" wide and 21.5" in height from the crew floor shall offer optimum visibility of the windshield and cab interior from any seated position. No Exception.
- The engine tunnel at the driver's position shall be a tapered design, featuring 24" clear width at floor level, first taper shall start 16.5" from floor level and taper inward for a clear width of 26" and the final taper shall start at 21" from floor level and taper inward for a clear width of 33".
- The engine tunnel at the officer's position shall be a tapered design, featuring 23" clear width at floor level, first taper shall start 16.5" from floor level and taper inward for a clear width of 22.5" and the final taper shall start at 21" from floor level and taper inward for a clear width of 31.5".
- The design shall offer a minimum of 30" for the driver and 28.5" for the officer as measured from the inside door pan to the top edge of the tunnel. The dimension measured at the "H" (hip) point, with the seat in the lowest position, shall be a minimum of 28.5" for the driver and 27" for the officer. No Exception.
- Recessed sections for ease of mounting equipment at the rear of the tunnel or for compartments and bases which can be used for installing Fire/EMS equipment and components such as hand- held radios.

CAB DASH

The cab dash shall offer heavy duty, durable construction using resin transfer molding (RTM) technology formed composite material. The composite material shall be .28" thick for improved resistance and military type strength.

RTM is a low pressure, closed molding process which offers a dimensionally accurate and high-quality surface finish composite molding, using liquid thermoset polymers reinforced with various forms of fiber reinforcements. The matrix selection of polymer and reinforcement dictates molding mechanical and surface finish performance.

ABS polymer construction shall not be acceptable. No Exceptions.

The cab dash shall offer a finish of a polyurethane coating for a rugged design and finish. No Exceptions.

The polyurethane finish shall provide a tough, flexible, impact-absorbing, chemical & abrasion-resistant, even-textured and skid-resistant surface. The polyurethane finish shall offer durability and scratch resistance even against today's advanced firefighting turnout materials with consistent, even coverage and a uniform texture. The polyurethane coating finish shall resist fading from UV light.

This construction shall allow for a clean, seamless dash area that shall reduce unnecessary joining of cab dash components. This design allows for the following features:

- Optimal heating and cooling of cab occupants, HVAC louvers shall be integrated into the gauge panel with a total of six (6) louvers; three louvers pointing at the driver and three louvers pointing at the officer.

- The cab dash instrument cluster shall be installed on a painted panel. This panel shall provide for easy removal to increase serviceability and provide ease of maintenance.

- For improved safety cab switches and controls shall be ergonomically located within easy reach of the driver when in the seated position with seatbelts fastened. This design will reduce driver distraction and increase safety by putting frequently accessed driver controls within easy reach to allow the driver more time to focus on the road.

- The officer side cab dash shall have a painted fire service grade RTM composite fiberglass panel that shall house the three HVAC louvers on the officer side. This panel will also provide ergonomically located switches and controls for the officer. All controls shall be within easy reach while in the seated position with seatbelts fastened.

- Access panels on the top of the dash for both the driver and officer sides easing maintenance access to controls, components and gauge assemblies

- The driver side dash shall include gauges for primary air pressure, secondary air pressure, a Pacific Insight instrumentation gauge panel and the DEF gauge as standard

- The driver side dash shall also include two (2) lower panels to the left and right of the steering column for FMVSS switches such as the Off/Ignition and start switches and the park brake assembly

- The driver dash shall include a panel for inclusion of an optional Weldon Vista screen and six (6) additional switches or the HVAC controls and additional switching to the right of the Driver

- The officer dash shall include a recessed area for optional mounting cradles or brackets for a laptop computer, mobile data terminal, map compartment or clip board

- The officer dash shall include a panel for inclusion of an optional Weldon Vista screen and or provisions for switches and gauges to the left of the Officer

CAB DASH & ENGINE TUNNEL

The cab dash and the engine tunnel of the cab shall be coated with Line-X bed liner coating for a durable finish. The color shall be black.

MODULAR CENTER DASH CONSOLE

The dash and front portion of the tunnel shall include an angled modular console centered between the driver and officer positions.

The console shall feature:

- Heavy-duty housing constructed from 14-gauge steel which is powder coated with a durable semi-gloss textured black finish to provide glare and corrosion resistance

- The console top constructed of black anodized Aluminum extruded rails which allow for mounting brackets, plates, and other console options

- Integral nut tracks which allow mounting of equipment to the sides of the console by way of sliding 1/4"-20 hex nuts

- A hinged lid constructed from 16-gauge steel also powder coated for corrosion resistance
- The availability of pre-wiring for specific components
- A modular design for ease of changes and future additions such as changing out brands of radio, types of sirens or adding accessory space
- The console shall offer 4 areas, 2 upper sections, A and B and 2 lower sections, C and D with mounting plates for optional components.

MICROPHONE TABS

Two (2) black mounting plate(s) containing mic tabs shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:
Havis Console - Upper Portion
Havis Console - Upper Portion - Option 12

BLACK MOUNTING SWITCH PLATE

A black mounting plate containing a switch panel with seven (7) switches shall be provided and incorporated in the center dash console.

BLACK MOUNTING PLATE FOR RADIO

One (1) black mounting plate(s) containing radio mounting shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

BLACK MOUNTING PLATE FOR POWER POINTS

Two (2) black mounting plate(s) containing two (2) 12 volt power points and one (1) dual USB power point shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

CONSOLE MOUNTED SIREN

One (1) black mounting plate(s) containing mounting for a siren shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

CONSOLE MOUNTED TRAFFIC LIGHTBAR CONTROLLER

One (1) black mounting plate(s) containing a plate to mount the traffic advisor lightbar controller shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

CONSOLE MOUNTED AM/FM RADIO

One (1) black mounting plate(s) containing a mount for an AM/FM radio shall be provided and incorporated in the modular dash console.

Please use locations A or B only
Havis Console - Lower Portion
Havis Console - Lower Portion - Option 5

BLACK MOUNTING PLATE

One (1) black mounting plate(s) containing blank plates shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

CONSOLE MOUNTED LOCKING ACCESSORY BOX

One (1) black locking accessory box shall be provided and incorporated in the modular dash console. The lock shall be of combination type.

The location(s) shall be as follows:

CONSOLE MOUNTED ACCESSORY BOX

One (1) black mounting plate(s) containing an open accessory box shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

CONSOLE MOUNTED CUP HOLDER

Two (2) black mounting plate(s) containing two cup holders shall be provided and incorporated in the modular dash console.

The location(s) shall be as follows:

INSTRUMENTATION PANEL

The instrumentation panel inlay shall be painted a flat black.

CAB HEADER

The cab header shall offer Heavy-duty, durable construction using resin transfer molding (RTM) technology formed composite material. The composite material shall be .28" thick for improved resistance and military type strength.

RTM is a low pressure, closed molding process which offers a dimensionally accurate and high-quality surface finish composite molding, using liquid thermoset polymers reinforced with various forms of fiber reinforcements. The matrix selection of polymer and reinforcement dictates molding mechanical and surface finish performance.

ABS polymer construction shall not be acceptable. No Exceptions.

The cab header shall offer a finish of a polyurethane coating for a rugged design and finish. No Exceptions.

The polyurethane finish shall provide a tough, flexible, impact-absorbing, chemical & abrasion-resistant, even-textured and skid-resistant surface. The polyurethane finish shall offer durability and scratch resistance even against today's advanced firefighting turnout materials with consistent, even coverage and a uniform texture. The polyurethane coating finish shall resist fading from UV light.

The cab header shall also be purpose built for integration of Fire/EMS components and ease of maintenance with panels above both the driver and officer positions measuring 8" wide x 15"long for mounting radios, aerial controls and switches.

HVAC HEATING AND COOLING SYSTEMS

The interior cab climate control shall be comprised of a triple system that shall include a defroster, a cab and crew heater and air conditioner for a complete HVAC system. The air conditioning system shall be comprised of compressor, condenser, and a minimum of three (3) evaporators to provide consistent temperature control throughout the entire cab.

The system shall be rated as an Emergency Vehicle grade for the use in Fire and Rescue style vehicles and shall provide environmental air treatment in accordance with published SAE standards.

The HVAC system shall be tested and certified by the component manufacturer and a third-party independent certified testing laboratory, including all three systems. Documentation of test results shall be provided with the bid. No Exceptions.

The HVAC system shall be a total and complete system, and shall provide sufficient defrosting, heating and cooling to the entire cab. The HVAC system shall meet or exceed all specified items without the use of auxiliary heating and cooling systems.

DEFROSTING SYSTEM

The defrosting system shall feature:

- To provide maximum defrost and heating performance, a 30,000 BTU heater-defroster unit will be provided inside the cab.
- The defroster unit will be strategically located under the center forward portion of the instrument panel. For easy access, a removable cover will be installed over the defroster unit.
- Six (6) vents shall be located in the top forward portion of the dash for superior defrosting properties across the entire windshield.
- Defrost vents for the driver and officer windows.
- The system shall be capable of clearing 90 percent or more of the windshield in fifteen (15) minutes or less after a three (3) hour cold soak at 0 degrees Fahrenheit (-17.78 degrees Celsius).
- The system shall exceed Flash Fogging standards that are set forth in the SAE Heavy-duty Cab with Sleeper specifications. Documentation from a third-party testing facility shall be available upon request. No Exception.
- The defroster will include an integral Aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the one (1) piece windshield.

HEATING SYSTEM

The heating system shall feature:

- Delivery of a minimum of 82,000 BTU/hour of heat to the entire cab.

- Heat and air circulation shall be provided to the driver and officer foot area of the cab as standard through ducting in the foot well area of both positions. No Exception.
- Substantial air movement and heating provided to the driver and officer's position, Composite dash will have six (6) adjustable louvers, located in the dash, three (3) adjustable louvers directed at the driver and three (3) adjustable louvers directed at the officer and floor vents at the driver and officer. Aluminum dash will have (4) adjustable louvers, located in the dash, two (2) adjustable louvers directed at the driver and two (2) adjustable louvers directed at the officer and floor vents at the driver and officer.

- Dual overhead units, with five (5) adjustable louvers shall be mounted above the rear facing seat positions on the driver and officer side of the cab

- The heater shall be plumbed with a shut off valve at the engine, so that the coolant bypasses the heaters.

AIR CONDITIONING

The air conditioning system shall feature:

- One (1) evaporator shall be located under the center dash and Two (2) crew overhead evaporators located near the B-pillar on each side of the cab allowing for greater frontal visibility for the forward-facing crew seating and allowing for more interior mounting of accessories.

- A gravity condensation drain system shall be utilized. These drains shall remove all condensation from the evaporator units and direct it to the exterior of the chassis cab for optimal performance. Systems utilizing pumps to remove condensation, or gravity systems with poles or other obstructions located within the cab to route drains through shall not be acceptable. No Exceptions.

- Substantial air movement for optimum cooling shall be provided to the driver and officer positions, with six (6) adjustable louvers, located in the dash, three (3) adjustable louvers shall be directed at the driver and three (3) adjustable louvers shall be directed at the officer and floor vents at the driver and officer.

- The air condition system shall be capable of cooling the cab from outside ambient average temp of 104 degrees Fahrenheit (40 degrees Celsius) to an average inside cab temp of 71

degrees Fahrenheit (22 degrees Celsius) at no less than 50% humidity in 30 minutes with an engine RPM of 1250, after a two (2) hour heat soak. A certification document from the testing facility shall be available upon request. No Exception.

Proposals offering ceiling mounted evaporator units in the center of the cab above or on the engine tunnel shall not be accepted as this is a safety consideration due to the lack of visibility and communication within the cab.

CAB PAINT AIR CONDITIONING CONDENSER COVER

The air conditioning condenser cover shall be made out of aluminum and shall be painted to match the roof color. Plastic condenser covers will not be acceptable. No Exception.

HEATER HOSE

The heater hose inside the cab for the HVAC system shall be premium silicone hose.

Rear Crew Controls Advanced Wiring

The Rear Crew HVAC controls will be wired so that whenever the A/C is turned on in the cab the rear crew A/C fans will also come on at the low setting, to prevent the evaporators from freezing up.

Electronic Heater Valves

The Electric Shut Off Valves for the HVAC Heater will be controlled by a Driver's side dash mounted switch.

CONDENSER

The cab air conditioning system shall include one (1) low profile HE-condenser which shall be centered forward on the roof of the cab.

CLEANAIR RECIRCULATION AIR SCRUBBER

The fire apparatus cab shall be equipped with a CleanAir cab recirculation air filtration system. The CleanAir system shall be mounted behind the engine tunnel and be designed to remove harmful particles, volatile organic compounds (VOCs), and other gases from the cab. The system shall contain two (2) different filters housed in a metal box. The activated charcoal filter shall meet a minimum efficiency 75% for removing VOCs on the first pass as tested by an independent particulate testing facility. The testing shall be done to ASHRAE Standard 145.2 Performance of Gas-Phase Air Cleaning Systems. No Exception.

The first filter in the system shall be designed to remove particles such as smoke, vehicle exhaust emissions, dust, etc. from the cab through the use an electrostatically charged MERV (minimum efficiency reporting value) 15 filter. This filter shall be designed to trap 85%-95% of particles with as small as .3 microns. No Exception

The second filter shall be an activated charcoal filter with both coconut shell carbon and potassium permanganate. This combination shall be capable of removing more than 350 different types of contaminants and gasses from the air. The filter shall be trap and/or change the chemical chemistry of the VOCs. No Exception.

The system shall be designed to recirculate the air inside the cab a minimum of 3 times every 10-15 minutes depending on the size and configuration of the cab.

The system shall be wired through the battery master switch and shall have an on/off switch located near the driver or officer position.

Documentation from the independent laboratory the test results shall be provided upon request.

HEATING AND COOLING CONTROLS

The HVAC system shall be controlled from the Driver dash through three (3) turn style knobs for the temperature control, the fan control and for the mode. Fan controls shall also be available to the rear crew area.

REAR CREW ARE CONTROLS – FORWARD FACING DRIVER'S SIDE

The controls for the crew area heat shall be mounted overhead, along the ceiling. The final location shall be determined at the preconstruction.

SEAT AND SEAT BELT COLOR

This seat in the cab shall be gray in color with a red seat belt.

DRIVER SEAT

The driver's seat shall be a 911 Seats XL, wide series seat.

Standard features of this 10way Non SCBA 3pt ABTS (all belts to seats) include 108 degree recline, adjustable headrest, wide contoured back with 2 way adjustable lumbar. Electronic adjustments include fore/aft, up/down, front/rear tilt.

The seat shall feature an XL 21-inch-wide comfort cushion including Seats Incorporated exclusive EVC (elastomeric vibration control); easing tailbone pressure, enhancing comfort and reducing vibration by up to 50%. This system has Seats Inc's D2 (dual density) foam combining

a soft topper foam pad further enhancing comfort, and a high-density bottom foam base to promote longevity.

The seat(s) shall have a 7-year manufactures warranty no exception.

Cushion reinforced with French seaming and is NFPA compliant with an occupancy sensor.

SEAT BELT SINGLE RETRACTOR

The seat shall feature 3pt ABTS (all belts to seats). The seat belt shall feature Ready Reach to ensure that the seat belt is easy to see and grab while in full turnout gear.

SEAT BACK

The seat back shall incorporate a standard style headrest.

SEAT MOUNTING DRIVER

The driver's electric seat shall be installed in an ergonomic position in relation to the cab dash.

The power seat or seats installed in the cab shall be wired directly to battery power.

SEAT MATERIAL

The seats shall include Turnout Tuff material; this urethane-coated denier nylon is water repellent to 75 PSI of water Pressure. Suitable for Heavy Duty applications, this cloth has a bursting strength of 300+ pounds per foot and surface abrasion of 1000+ cycles-Heavy Grit Wheel. Modeled after Turnout Gear, this material contains a rip-stop weave stopping unraveling if punctured standing up to hard working environments. Turnout Tuff is manufactured to meet flammability requirements including FMVSS 302, UFAC class 1, and California Fire Code Technical Bulletin No. 117 Section E.

SEAT BACK LOGO

The seat back shall include the Fire Department's logo. The logo shall have the following placement depending on seat make and model;

- Centered on headrest
- Left side of split headrest
- Centered on seat back

Seat Logo Fire Department (Set Up Fee)

DRIVER SEAT BOX STORAGE COMPARTMENT

There shall be a storage area under the driver's seat. The compartment shall be 21.25 inches wide, 22.50-inches long, and 6.25 inches high. The access opening shall be 15.00 inches wide and 4.50 inches high.

ALUMINUM ACCESS DOOR

There shall be an aluminum door cover provided for the driver and officer seat compartment. The door shall be coated to match the interior of the cab, and it shall be equipped with a piano style hinge and a manual latch.

OFFICER SEAT

The Officer's seat shall be a 911 Seats Incorporated XL, wide series seat

Standard features of this 6 way SCBA 3pt ABTS (all belts to seats) include 108 degree recline, adjustable headrest, wide contoured back. Electronic adjustments include fore/aft and up/down.

The seat shall feature a 21-inch-wide XL comfort cushion including Seats Incorporated exclusive EVC (elastomeric vibration control); easing tailbone pressure, enhancing comfort and reducing vibration by up to 50%. This system has Seats Inc's D2 (dual density) foam combining a soft topper foam pad further enhancing comfort, and a high-density bottom foam base to promote longevity.

The seat(s) shall have a 7-year manufactures warranty no exception.

Cushion reinforced with French seaming and is NFPA compliant with an occupancy sensor.

SEAT BELT SINGLE RETRACTOR

The seat shall feature 3pt ABTS (all belts to seats). The seat belt shall feature Ready Reach to ensure that the seat belt is easy to see and grab while in full turnout gear.

SEAT BACK

The seat back shall include a Seats Incorporated Halo mechanical self-contained breathing apparatus (SCBA) bracket. The Positive Locking Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew

compartments of fire truck cabs. The bracket shall be third Party tested to ten (10) times the force of gravity.

The bracket shall include Plasti-dipped rings designed to fit the full range or bottle diameters. Vertical height adjustment to accommodate different bottle hights. Easily achieve a safe lock without risking damage to equipment. Center cushion release mechanism.

PARADE PANEL

The seat shall come with a parade panel.

SEAT MATERIAL

The seats shall include Turnout Tuff material; this urethane-coated denier nylon is water repellent to 75 PSI of water Pressure. Suitable for Heavy Duty applications, this cloth has a bursting strength of 300+ pounds per foot and surface abrasion of 1000+ cycles-Heavy Grit Wheel. Modeled after Turnout Gear, this material contains a rip-stop weave stopping unraveling if punctured standing up to hard working environments. Turnout Tuff is manufactured to meet flammability requirements including FMVSS 302, UFAC class 1, and California Fire Code Technical Bulletin No. 117 Section E.

SEAT BACK LOGO

The seat back shall include the Fire Department's logo. The logo shall have the following placement depending on seat make and model;

- Centered on headrest
- Left side of split headrest
- Centered on seat back

OFFICER'S SEAT BOX STORAGE COMPARTMENT

There shall be a storage area under the officer's seat. The compartment shall be 19.75 inches wide, 17.50 inches long, and 6.25 inches high. The access opening shall be 9.00 inches wide and 4.50 inches high.

FORWARD FACING CENTER SEAT

Two (2) forward facing center crew area seat(s) shall be 911 Seats Incorporated XL, wide series flip bottom seat(s).

The seat(s) shall also feature a 21-inch-wide XL comfort cushion including Seats Incorporated exclusive EVC (elastomeric vibration control); easing tailbone pressure, enhancing comfort and reducing vibration by up to 50%. This system has Seats Inc's D2 (dual density) foam combining a soft topper foam pad further enhancing comfort, and a high-density bottom foam base to promote longevity. Seat to include wide comfort back with contoured foam.

The seat(s) shall have a 7-year manufactures warranty no exception.

Cushion reinforced with French seaming and is NFPA compliant with an occupancy sensor

Belt Orientation- LH & RH to Door

SEAT BELT SINGLE RETRACTOR

The seat shall feature 3pt ABTS (all belts to seats). The seat belt shall feature Ready Reach to ensure that the seat belt is easy to see and grab while in full turnout gear.

SEAT BACK

The seat back shall include a Seats Incorporated Halo mechanical self-contained breathing apparatus (SCBA) bracket. The Positive Locking Mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The bracket shall be third Party tested to ten (10) times the force of gravity.

The bracket shall include Plasti-dipped rings designed to fit the full range or bottle diameters. Vertical height adjustment to accommodate different bottle hights. Easily achieve a safe lock without risking damage to equipment. Center cushion release mechanism.

PARADE PANEL

The seat shall come with a parade panel.

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

SEAT MATERIAL

The seats shall include Turnout Tuff material; this urethane-coated denier nylon is water repellent to 75 PSI of water Pressure. Suitable for Heavy Duty applications, this cloth has a bursting strength of 300+ pounds per foot and surface abrasion of 1000+ cycles-Heavy Grit Wheel. Modeled after Turnout Gear, this material contains a rip-stop weave stopping unraveling if punctured standing up to hard working environments. Turnout Tuff is manufactured to meet flammability

requirements including FMVSS 302, UFAC class 1, and California Fire Code Technical Bulletin No. 117 Section E.

SEAT BACK LOGO

The seat back shall include the Fire Department's logo. The logo shall have the following placement depending on seat make and model;

- Centered on headrest
- Left side of split headrest
- Centered on seat back

SEAT FRAME FORWARD FACING ENCLOSED

The forward-facing center seats shall include an enclosed seat box which is located and installed on the rear wall.

The seat box shall be constructed of no less than 5052-H32 .19" thick aluminum plate.

SEAT FRAME FORWARD FACING ACCESS

The seat frame shall include three (3) cutouts. There shall be one on each side facing the rear crew doors, and one in the center facing the engine tunnel for access.

SEAT FRAME FORWARD FACING ACCESS

The seat frame shall include three (3) aluminum doors, one (1) on the driver side and one (1) on the officer side, facing the rear crew doors, and one in the center of the wall facing the tunnel for access.

SEAT COMPARTMENT DOOR FINISH

The seat box doors shall be finished to match the interior finish of the cab.

SEAT COMPARTMENT FINISH

The seat frame shall be finished to match the interior finish of the cab.

HELMET STORAGE MODEL

Four (4) Ziamatic model UHH-1 helmet storage brackets shall be provided with the cab.

Exterior Grab Handles 18" Aluminum
Exterior Grab Handles Black W/ Lighting

EXTERIOR GRAB HANDLES

One (1) Black 18" exterior assist handle shall be mounted behind each of the cab doors. The grab handle shall be made of 1.25" diameter aluminum to enable non-slip assistance with a gloved hand and mounted on stanchions. The handle shall feature blue LED lights which shall illuminate when the respective door is opened. The handles shall be mounted to the cab with nutserts. No Exception.

GRAB HANDLE LIGHT ACTIVATION

The grab handle lights shall activate when the park brake is engaged.

ADDITIONAL GRAB HANDLE

The cab face shall include a black anodized 11" aluminum grab handle mounted on stanchions which shall be mounted in the center of the grille.

CAB FASCIA

The cab fascia shall offer a traditional, yet aggressive appearance, in its design and shall be constructed of work-hardened 5052-H32 aluminum. This design shall feature:

- A super structure which is fully welded to the cab, for a seamless and robust integration
- Thermoformed headlamp bezels, constructed of impact resistant, polycarbonate composite which is vacuum metalized to eliminate pealing and bubbling of a chrome type film or plating
- Traditional style headlight bezels with 4 x 6 high intensity headlights which shall add a classic look to the fascia while improving visibility

FRONT GRILLE

A prominent front grille shall punctuate the aggressive design of the cab with its outboard wing style warning light bezels and heavy framework. The front grille shall feature:

- Fabricated construction for superior strength and durability
- Line-X black finish for a distinctive appearance
- Up to six (6) warning light locations along the mid bar for a variety of warning light combinations

LIGHT BEZEL

The front grille shall include wing light bezels that are able to house two (2) 4" x 6" lights. The bezels shall be constructed of steel and coated in black Line-X.

DEPARTMENT NAME IN CENTER GRILLE BAR

The fire department's name shall be laser cut into the center bar of the stainless steel grille. There shall be room for up to (10) characters that are no more than three-inch (3") tall.

>>Madera City

GRILLE BACK LIGHTING

The fire department's name shall be back lit in red. The grille light shall come on with the E-Master switch or when the park brake is set.

Grille Glo

The grille shall have two (2) LED Stand Alone lights located behind the center grille bar to create an illuminating effect within the grille mesh.

The lights shall be activated when the park brake is engaged.

FRONT AMERICAN FLAG GRILLE INLAY

The front grille shall include an American Flag honeycomb inlay of steel, painted black, which shall provide air flow through the grille and provide a sporty, muscular appearance to the front of the apparatus.

FLUID FILLS & CHECK

For ease of maintenance and access, the following fluid checks shall be located behind the tiltable and/or removable mesh panel:

- Engine Oil dipstick
- Engine Coolant Sight Glass
- Power Steering Fluid dipstick
- Windshield Washer Fluid

The following fluid fill shall be located behind the tiltable and/or removable mesh panel:

- Engine Oil
- Power Steering

Proposals including access to fluid checks through the tunnel or by raising the cab shall not be considered.

LED HEADLIGHTS

A set of 4 FireTech 4X6 LED Headlights shall be provided. The kit shall consist of 2 fixtures which operate as SAE VOR "high/low" beams, and 2 fixtures which operate as SAE VO "high-only" beams. All 4 headlights shall have a SAE "P" parking lamp halo surrounding the driving beams, which shall be energized any time the vehicle park brake is set. Optically, on the high/low headlight, an articulated set of elliptical optics must be used to illuminate the foreground while operating in "low" beam mode. The lens of the high/low beam headlight shall be marked "DOT VOR SAE HL P 16." The lens of the high-only beam shall be marked "DOT VO SAE HL P 16." All circuits of the headlights shall be designed to operate from 9-32v DC.

All 4 fixtures must be manufactured such that the internal pressure of the headlight remains constant regardless of operating temperature. The housing shall be equipped with a mechanically fastened GORE PolyVent. Similar functioning vent materials affixed to the housing using adhesive shall not be acceptable for substitution.

The headlights shall be installed, wired, and aimed, in accordance with FMVSS108. The manufacturer of the headlights shall warrant the headlights against defects for the life of the apparatus.

The headlights shall be warranted against failure and condensation accumulation by Hiviz for the life of the apparatus.

DAYTIME RUNNING LIGHTS

The daytime running light feature shall include the headlights on low beam and the marker lights shall be illuminated and a wig-wag or alternating feature.

HEADLIGHT FLASHER

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled "On Scene" when the park brake is applied.

HEADLIGHT FLASHER SWITCH

The alternating high beam headlamp switch shall be located on the driver console.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia in the upper buckets, on each side of the cab grille.

104 OS, 105 OS, and 104 DS, 105 DS

FRONT TURN SIGNALS

Two (2) Whelen M6 LED square, front turn signal assemblies with clear lens shall be included. Each turn signal shall be mounted in an attractive façade style bezel which is an integral part of the fascia.

TURN SIGNAL LOCATION

The turn signals shall be located on the front fascia in the upper wing locations, one each side of the cab grille.

103 OS & DS

FRONT MARKER LAMPS

The cab front shall include five (5) LED amber marker lamps above the windshield in accordance with the Department of Transportation requirements.

SIDE MARKER LIGHTS

Two (2) LED side marker light assemblies shall be mounted on the side of the cab ahead of the driver door, adjacent to the front head lamp bezel.

HEADLIGHT AND MARKER LIGHT ACTIVATION

The head light and marker lights shall be activated through a switch on the driver's panel.

CAB FENDERS

The cab wheel wells shall include full width, 14-gauge 304 stainless-steel cab fenders to resist corrosion and enable easier cleaning maintenance. The fenders shall be powder coated black with a slight texture. The inner liner, measuring 18" wide shall be constructed of plastic with an outer

fenderette measuring 2.5" wide. The inner liner shall be installed with 410 stainless-steel hardware that has been coated with black zinc oxide.

COMMANDER LOGO

A COMMANDER logo shall be installed on each side of the chassis cab.

FRONT MUD FLAPS

The cab and chassis shall be provided with rubber front mud flaps.

CAB TILT SYSTEM

The cab shall be a full tilt style. A hydraulic cab lift system shall be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves. The cab tilt shall be mounted on the right hand side of the chassis frame in front of the batteries below the frame. The mounting bracket shall be Hot Dipped Galvanized.

The dual lift cylinders shall lift the cab 45 degrees from a horizontal plane facilitating easy engine maintenance. The chassis engine shall be able to be removed if required without tilting the cab beyond 45-degrees.

The center line of the chassis cab tilt shall be a minimum of 76" from the center line of the front axle, providing a large corridor between the cab and front tire for maximum work space and accessibility to fan, fan belt, fan drive, air compressor, power steering pump, alternator and air filter.

The tilt angle shall allow access to the engine and area under the cab without contacting any components mounted to the gravel shield.

The cab shall include a four (4)-point rubber isolated cab pivot and mounting system. The rear histic mounts shall be isolated from the chassis frame to reduce the transfer of road vibrations and frame torque into the cab, while providing superior handling characteristics.

The front cab pivot assemblies shall be a 1/2" A36 steel plate with a .31" thick 2-1/2" diameter tube cross member mechanically attached to the cab and frame. There shall be two (2) greaseable rubber isolated engineered bushings to reduce the transfer of road vibrations into the cab.

The cab shall be locked down by a two (2)-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The cylinders shall include blocking valves (velocity fuses) which prevent motion when no control buttons are pushed. In the event of a hydraulic system failure, the valves shall retain the fluid in the cylinders.

A redundant mechanical stay arm shall automatically be engaged once the cab has been fully raised. Before lowering the cab, this device must be disengaged using the stay arm control located on the driver's side rear of the cab, providing the operator protection from high engine exhaust temperatures. The stay arm shall be safety yellow for high visibility so that it is easy to see whether the arm is in place or not. No Exception

All mounting points shall be bolted directly to the frame rail.

The cab lift safety system shall be interlocked with the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the battery master switch is in the on position. If the parking brake is release, the cab tilt mechanism shall be disabled.

There shall be a manual pump incorporated in the event of a system failure to the cab tilt system.

A warning light shall illuminate in the cab instrument panel to indicate whenever the cab is not fully latched in the locked down position, and the parking brake is release.

CAB TILT LIMIT SWITCH

An adjustable cab tilt limit switch shall be included with the cab tilt system. The switch shall effectively limit cab's travel to avoid impact with bumper mounted items, or station ceiling clearance, when being tilted.

There shall be a safety bar to hold the cab at the new adjusted height for additional safety.

CAB TILT LOCK DOWN INDICATOR

The cab dash shall include a message located within the dual air pressure gauge which shall alert the driver when the cab is unlocked and ajar. The alert message shall cease to be displayed when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mounts.

In addition to the alert message an audible alarm shall sound when the cab is unlocked and ajar and the parking brake is released.

REARVIEW MIRRORS

Ramco model BLK-TX-1350-PCHR bus style mirrors shall be provided. The mirror heads shall be injection molded textured black ABS plastic and shall measure 9.75" wide x 13.5" high. The

mirrors shall be mounted one (1) on each the driver and officer doors of the cab with black aluminum arms.

The mirrors shall feature an upper heated remote controlled flat glass and a lower heated remote controlled convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting reducing vibration. The mirrors shall be corrosion free under all weather conditions.

REARVIEW MIRROR REMOTE ACTIVATION

The driver's panel shall include activation for the rearview mirrors remote function. The driver panel shall also include a switch activating the mirrors to be heated.

CAB TWO TONE PAINT

The cab surface shall be thoroughly washed with grease cutting solvent (PPG DX330) prior to any sanding. The cab surface shall then be sanded and minor imperfections filled and sanded. The prepared surface shall then be washed again with (PPG DX330) to remove any contaminants from all surfaces to be painted.

The first coating to be applied shall be a pre-treat epoxy primer (.5 to 1.0 dry film build) for maximum adhesion to the body material. The next two to four coats shall be a polyurethane primer resurfacing agent (PPG F4936). The film build shall be 4-6 mils when dry. The primer coat, after appropriate dry time, shall be sanded with 320-600 grit sandpaper to ensure a maximum gloss finish. The last step shall be an application of at least three coats of PPG FDG polyurethane two-component color (single stage). The film build shall be 2-3 mils when dry. The single stage polyurethane shall provide a UV barrier to prevent fading and chalking.

The cab shall then be painted with the specific colors designated by the customer with a minimum thickness of 2.00 mils of finished paint, followed by a clear top coat not to exceed 2.00 mils.

CAB PAINT UPPER

The upper or secondary cab color shall be PPG _____ color and _____ number.

300 Kilimanjaro White

CAB PAINT LOWER

The lower or primary cab color shall be PPG _____ color and _____ number.

PPG 911659- RED

CAB PAINT BREAK FINISH-SINGLE

The paint break line shall be of a finish grade quality that shall not require that any pinstripe be installed over the paint break line.

CAB UNDERCOAT

The cab shall have an undercoat applied prior to the cab being set on the running gear. The under coat shall be a waterborne, one-component, air dry undercoat formulated to prevent chipping, cracking and marring of painted or unpainted surfaces after exposure to high impact sand, gravel or other abrasive materials. It shall also have high corrosion resistance.

PAINT SPRAY OUT

The customer shall be supplied with a paint spray out for customer approval prior to the cab being painted.

FRONT AXLE

The front axle beam shall be rated to carry 18,000 lbs. and consist of a fabricated box cross section construction with 100ksi plate and a continuous beam architecture to minimize stress points for added durability. The box shaped cross section resists horizontal, vertical, and twisting forces more effectively than traditional I-beam axles while helping to reduce dynamic camber and toe changes therefore a traditional I-beam axle shall not be considered. The axle shall incorporate a removable kingpin feature for ease of kingpin serviceability. The knuckles shall allow for compatibility with disc brakes mounted at the 12 o'clock position and with drum brakes and allow for wheel cut up to 45 degrees. They shall also utilize premium kingpin bushings and seals to provide enhanced protection from the elements to improve bushing life.

The axle shall have a magnetic plug.

The axle shall be warrantied for five (5) years or five hundred thousand (500,000) miles whichever comes first. No Exception.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

FRONT SUSPENSION

The suspension shall consist of multi-leaf parabolic springs with double wrapped front eye that are packaged within an integrated clamp group that allows for ease of OEM assembly on to the axle beam and reduced part count. The clamp group bolts are tightened on the top of the clamp group opposed to the traditional U-bolt on the bottom making it easier to access with a torque wrench for servicing. The spring shall also include a lower shock attachment with an upturned eye. The springs will contain threaded pin bushings to allow simplification of spring alignment as well as long service life and improved ride quality. The suspension and spring geometry will be optimized to provide improved bump steer and Ackermann. Two ZF Sachs twin-tube shocks shall be provided with the front suspension assembly. The shocks shall be specially developed for parabolic leaf springs with a digressive characteristic curve using a patented piston system. The shocks shall feature multi-stage piston and base valves. The combination of valves shall achieve the desired damping characteristics that are ideal for the application. No Exception.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85 and shall include the following:

- A balanced, hydraulic, positive displacement, sliding vane power steering pump which is gear driven from the engine
- One-piece, 2" diameter drag link for maintaining consistent wheel alignment resulting in less maintenance.
- The steering gear shall be mounted on a plane that is at a 9-degree angle in relationship to the center plane of the chassis. This mounting technique is designed to reduce the operating angle of input steering shafts. A more direct, responsive, and smoother handling vehicle will result from these unique design characteristics.

A certified torque and geometry study by TRW shall be available upon request.

CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the apparatus manufacturer.

Alignment documentation shall be available upon request.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 45 degrees to the left and right.

STEER TIRES

The steer tires shall be Michelin 315/80R 22.5 20PR "L" tubeless radial X Line Energy Z highway tread.

The steer tires shall feature:

- A stamped load capacity of 18,180 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 130 pounds per square inch

TIRE BALANCING

There shall be counter acting balancing beads used in all of the tires.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 9.00 inch polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and shall include Alcoa's Dura-Bright® finish with XBR technology as an integral part of the wheel surface. Alcoa Dura-Bright® wheels keep their shine without polishing. Brake dust, grime and road debris are easily removed by simply cleaning the wheels with soap and water.

FRONT BRAKES

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17" vented rotors. The disc brakes shall be provided with visual wear indicators.

The front brakes shall include brake chambers supplied by Meritor and shall be approved per application.

STEERING COLUMN AND WHEEL

The cab shall include a Douglas Autotech steering column. The steering column shall feature an 18", four (4) spoke steering wheel located at the driver's position; a five (5) position tilt and 2.25" telescopic adjustment. The steering wheel shall be provided with a black vinyl cover with foam

padding and a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

The chassis shall include dual electric 12-volt horn with a minimum 110 decibels.

REAR AXLE

A Meritor RS-24-160 driving axle shall be incorporated as the rear axle for the chassis. The axle shall feature:

- Rated capacity of 24,000 pounds
- Heavy duty Hypoid gearing for longer life, increased strength and quieter operation
- Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage
- Rigid differential case for high axle strength and reduced maintenance
- Rugged Dependability
- Rectangular shaped, hot formed housing with a standard wall thickness of .50” at spring seat for extra strength and rigidity
- A magnetic plug
- 5-year warranty

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

REAR SUSPENSION

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type parabolic multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

The rear suspension capacity shall be rated at 24,000 pounds based on the capacity of the brakes and rear tires.

REAR BRAKES

The rear brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors. The disc brakes shall be provided with visual wear indicators.

The rear brakes shall include brake chambers supplied by Meritor and shall be approved per application.

REAR SHOCK ABSORBERS

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

REAR AXLE DIFFERENTIAL CONTROL

The rear axle shall include a driver controlled differential lock. This shall allow the main differential to be locked and unlocked when encountering poor road or highway conditions, where maximum traction is needed, for use at speeds no greater than 25 MPH.

REAR AXLE DIFF. CONTROL ACTIVATION

The rear axle driver controlled locking differential control shall be activated through a switch on the driver's panel.

REAR TIRES

The rear tires shall be Michelin 11R 22.5 16PR “H” tubeless radial XZE 2 regional tread.

The rear tires shall feature:

- A stamped load capacity of 24,020 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch

TIRE BALANCING

There shall be counter acting balancing beads used in all of the tires.

REAR WHEEL

The rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with a polished outer surface and Alcoa Dura-Bright® wheel treatment with XBR® technology as an

integral part of the wheel. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

VALVE STEM EXTENSION - SINGLE AXLE

To allow for easy checking and inflation of the rear inner tire it shall be equipped with a multi-layer valve stem extension, the layers shall be as follows: starting from the inner to out layer, stainless steel metal core, air tube, stainless steel jacket, protective color.

VEHICLE TOP SPEED

The top speed of the vehicle shall be programmed at approximately 70 MPH +/-2 MPH at governed engine RPM.

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a minimum of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. A spring brake valve shall be installed to provide a controlled service brake application during an unlikely event including primary air supply loss. The system shall include an anti-compounding feature. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

The Meritor Wabco ABS system shall come with a three (3) year/300,000 mile parts and labor warranty.

w/ air manifold

AIR TANK BRACKETS & STRAPS

The air tank(s) shall be mounted to the frame rail with brackets that are hot dipped galvanized thereby creating a barrier and cathodic protection from corrosion, and eliminating the requirement for finish paint and the subsequent requirements for touch up paint and/or total repaint after a period of time due to nicks, chips and corrosion. Powder coated or painted air tank brackets shall not be accepted. No exception.

All of the air tank straps shall be plastic coated stainless-steel cable. No Exception.

PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

Park brake system shall include an anti-compounding feature.

PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted on the driver's side dash to the right of the steering column within easy reach of the driver.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 Plus air dryer with an integral 100-watt heater with a Metri-Pack sealed connector. The system shall have an integrated purge volume and integrated governor.

The system shall have the following features:

- Premium desiccant provides greater water adsorption
- Replaceable spin on cartridge for simple maintenance
- Compact light weight design
- Pressure relief safety valve

- Turbo cut-off valve for boosted compressor applications
- Service components are external for easy replacement
- Common service components proven for reliability and quality
- Integrated with the air governor.

MOISTURE EJECTORS

Manual cable actuated drain valves shall be installed on all reservoirs of the air supply system. The actuation pull cables shall be coiled and tied at each drain valve. The supplied cables when extended shall be sufficient in length to allow each drain to be activated from the side of the apparatus.

AIR SUPPLY LINES

A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed on the chassis. The primary (rear) brake line shall be green, the secondary (front) brake line orange, the parking brake line yellow and the auxiliary (outlet) will be black; in accordance with SAE standards. No Exception.

Brass push-lock type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

AIR OUTLET CONNECTION

A quick release air outlet female connector shall be installed in the cab for the use of auxiliary air tools.

The cab mounted air outlet connection shall be plumbed to the chassis auxiliary air system reservoir.

AIR OUTLET SHUTOFF VALVE

The air outlet shall include one (1) quarter turn shutoff valve.

AIR OUTLET FITTING TYPE

The air connector supplied shall be a .25" pipe thread provision in a bulk head for customer installation of quick disconnect air fitting.

AIR HORN RESERVOIR

One (1) air tank, with a 1200 cubic inch reservoir, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

FRAME

The chassis frame shall consist of single "C" style parallel rails, constructed of high strength low alloy and shall feature the following:

- A Stenx **MODEL 110XF** 10.19" high by 3.63" deep cold rolled steel frame or equivalent.
- The 10.19" frame height shall be maintained throughout the entire length of the frame to allow for maximum storage capacity for the entire apparatus.
- If frame rails that are larger than those specified are to be utilized, the maximum height of each frame rail shall not exceed 10.25" at any point on the frame rail. This will ensure the lowest possible vehicle center of gravity allowing maximum stability as well as providing the lowest body height possible.
- Frame rail shall have a consistent frame web throughout the entire length.
- The entire frame rail design shall be manufactured in the United States of America and readily available on the aftermarket.
- Grade 8 Structural fasteners, Huck bolts shall not be acceptable. No Exception.
- The hardware used for the chassis shall be are to be corrosion resistant. The process shall be dip-spin-bake coated with two coats of zinc/aluminum metal flake coating in an inorganic binder. Coating one is to be zinc flake and coating two is to be aluminum flake. The zinc flakes sacrificially corrode to protect the base metal. The aluminum flakes prolong the life of the zinc. Salt fog test life, based on ASTM B117 on unassembled fasteners, is 1000 hours to red rust. The same test on assembled fasteners is 750 hours to red rust. The two step coating is RoHS compliant as it eliminates the hexavalent chromium used in the passivation of electroplated zinc coatings to create yellow zinc (zinc dichromate). The elimination of the zinc plating also greatly reduces the likelihood that hydrogen embrittlement will occur. Hydrogen embrittlement is a side effect of electroplating that reduces toughness and can lead to fracture. No Exception
- Manufacturer's lifetime warranty

The frame ratings shall be as follows:

- 110,000 PSI minimum yield strength high strength low alloy steel
- Minimum Resisting Bending Moment (RBM) of 1,860,000-inch pounds per rail

To avoid frame cracking and failure over time, the top flange of the frame adjacent to the engine installation shall have a tapered design. Notches for engine components shall not be accepted due to fatigue and the potential for cracking. No Exceptions.

UNDER-FRAME REINFORCEMENT

An under slung frame reinforcement shall be installed below the frame rails in the transmission area to increase the vertical rigidity of the frame.

The under frame reinforcement provides:

- Enhanced handling
- Improved ride quality
- Increase resistance to frame and cross member fatigue
- Enhanced vehicle stability providing improved safety to occupants

CROSS MEMBERS

There shall be a minimum of seven (7) steel plate cross members installed on the apparatus.

- 50,000 psi minimum yield strength steel plate cross members
- Manufacturer's lifetime warranty to match frame warranty. No Exceptions.
- Installed with one-piece cross member gusset to maximize vertical strength and minimize cross member flex
- Crossmembers can be inverted when required to allow for PTO drive line installation without the need for notching or modifying the cross members in anyway. No Exceptions.

FRONT FRAME EXTENSION

A single piece 80,000 PSI steel extension shall be installed on the front of the frame rails.

- Reduces frame flex which translates into improved vehicle handling and ride quality
- Designs using multiple piece, bolted together extensions will not be acceptable since they are prone to more flexing, possible frame failure and cab cracking

- Allows radiator to be removed through the bottom of the frame extension without tilting the chassis cab
- Minimizes damage to the chassis cab in the event of frontal impact accident
- Maintains structural integrity of the chassis frame rails while attaching bumper extensions of varying lengths
- Splayed or notched frame rails and/or extensions shall not be accepted
- Provides foundational strength and stability of the cab tilt system which provides superior access to engine and cooling components

Units with Wheelbase 200" or larger or over 1,000 gallons of water and foam need a double frame

FRAME FINISH

The frame shall be powder coated to resist weather, dirt and other corrosive material.
Engine Placement

ENGINE

A Cummins L9 9.0 liter, four-cycle diesel fueled, turbo charged engine shall feature the following:

- One of the highest power to weight ratios in its class
- Heavy-duty replaceable wet liners, roller followers, by-pass oil filtration with replaceable spin on cartridge and targeted piston cooling for longer service in tough work environments
- Improved cooled EGR system
- 543 Cubic inches of displacement
- High pressure common rail fuel system producing a precise quantity of fuel at ultra high pressures
- Fully integrated, robust electronic engine controls
- Electric fuel lift pump. No Exceptions.

The engine shall be coupled with a Holset VGT™ (Variable Geometry Turbocharger).

The engine shall be filled with Citgo brand Citgard 500 (or equivalent) SAE 15W40 CJ4 low ash engine oil for proper engine lubrication.

The engine shall be EPA certified to meet the 2021 emissions standards without compromising performance, reliability or durability using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an original equipment manufacturer installed oil drain plug.

The engine shall include programming which will govern the top speed of the vehicle.

ENGINE PLACEMENT

The engine shall be a maximum of 36" from the center line of the front axle to the front face of the engine block. The engine valve cover shall be a maximum of 23" from the top of the frame.

The engine placement shall provide optimal weight distribution to the front axle to enhance vehicle handling. More weight out in front of the front axle can cause a “fulcrum effect” and cause unsafe “bump steer” conditions.

The engine shall be mounted in a position that provides for the lowest possible height of the interior engine tunnel. An engine tunnel height from the floor of the chassis cab shall be no more than 21” high inside the cab.

AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be integrated in the air dryer assembly.
Cummins L9 Surcharge

HORSEPOWER

The engine shall have 450 horsepower at 2100 RPM, with a governed speed of 2200 RPM.

The engine shall have 1250-foot pounds of torque at 1400 RPM.

The engine shall have a standard drain plug.

ENGINE FAN DRIVE

The engine cooling system fan shall incorporate a thermostatically controlled, one (1) piece nine (9) blade Horton clutched type fan drive, and shroud.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails, the fan shall engage to prevent engine overheating due to the fan clutch failure.

The clutch fan shall automatically engage in pump mode (when applicable).

AUXILIARY ENGINE BRAKE

A Cummins engine compression brake, for the six (6) cylinder engine, shall be provided. The engine compression brake shall:

- Activate upon 0% accelerator when in operation mode and activate the vehicle's brake lights.

TRANSMISSION PRE-SELECT

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed. The transmission shall assist the secondary braking system, thereby slowing the vehicle.

AUXILIARY ENGINE BRAKE CONTROL

An auxiliary engine brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.

- The throttle is at a minimum engine speed position.

- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The auxiliary brake shall be controlled through an on/off switch and individual low/medium/high selector switches on the Driver's panel.

ENGINE PROGRAMMING HIGH IDLE SPEED

The Engine high idle will be set at 1250 RPM. The high idle will be operational only when the parking brake is set and the truck transmission is in neutral.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output and optimize output of the HVAC system.

This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually, through a switch, or automatically re-engage when the brake is set, or when the transmission is placed in neutral.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located behind the fascia.

The filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame.

This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The intake shall also feature a cyclone style water separator to remove unwanted moisture from incoming air.

The engine shall include an air intake filter which shall be bolted to the frame and located under the front of the cab. This dry type filter shall ensure dust and debris is safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The filter must have a capacity of no less than 1350 cubic feet of air per minute. The filter paper media must be of a flame retardant treated material. An electric air filter restriction indicator shall also be included with the system.

ENGINE EXHAUST SYSTEM

The exhaust system shall include a one-piece diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction catalyst (SCR) to meet current EPA standards.
The selective catalytic reduction catalyst shall utilize a diesel exhaust fluid solution consisting of urea and purified water to convert nitrogen oxide into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system between the DPF and SCR chambers.

The system shall utilize 0.065-inch-thick stainless steel exhaust tubing between the engine turbo and the DPF.

The after-treatment canister through the end of the tailpipe shall all be connected with zero leak gasketed clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires with an exhaust gas diffuser.

The diffuser shall lower exhaust gas temperatures during the regeneration cycle.

DIESEL EXHAUST FLUID TANK

There shall be a molded cross linked polyethylene tank for the Diesel Exhaust Fluid (DEF). The tank shall have a capacity of not less than five (5) usable gallons (18.92 Liters) and shall be mounted on the left hand side of the chassis frame in front of the batteries below the frame. The mounting bracket shall be Hot Dipped Galvanized.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

DIESEL EXHAUST FLUID TANK

There shall be a black access door provided in the top rear step of left side crew area for access to the DEF tank.

ENGINE EXHAUST ACCESSORIES

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

ENGINE EXHAUST WRAP

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

DIESEL PARTICULATE FILTER CONTROLS

Provide DPF system status annunciation indicator lights, lights shall be installed on driver dash to alert driver when regeneration is needed and when DPF is in an active re-generation cycle.

Warning systems shall provide DEF low level warning.

Driver's dash shall be provided with two (2) controls for the Diesel particulate filter; one (1) manual regeneration switch to activate a regeneration cycle manually when passive burn is unobtainable due to driving conditions; and one (1) Regen "Inhibit Switch".

The switches shall be located in a covered location.

ENGINE COOLING SYSTEM

The radiator and the complete cooling system shall meet or exceed NFPA and engine manufacturer cooling system requirements.

The system shall include and feature the following:

- A vertically stacked charge air cooler providing the maximum cooling capacity for the engine. Proposals offering horizontally stacked charge air cooler shall not be acceptable. No Exceptions
- The charge air cooler and radiator shall measure not less than 1382 square inches
- A surge tank with a low coolant probe and capable of removing entrained air from the cooling system, with built in sight glass
- Radiator re-circulation shields to prevent heated air from re-entering the cooling system and affecting performance

- Mounts allowing the entire radiator to drop through the frame for service when needed - No Exceptions

- Engine placement shall provide a minimum of 8" between the engine fan and radiator to maximize the airflow and cooling of the engine.

- A Spin on Element water filter with corrosion inhibitor shall be provided for the cooling system. No Exception.

- The coolant filter shall be provided with two (2) shut off valves, one (1) one inlet and one (1) outlet. No Exception.

- Cooling system shall be tested and certified by the engine manufacturer

COOLANT HOSES

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include constant tension spring clamps.

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.

Supplemental coolant additives (SCA) are not required as this is part of the extended life coolant makeup.

ADDITIONAL COOLANT SHUT OFF VALVE

An additional coolant shut off valve with connection shall be installed in the chassis coolant lines with a connector. This shall allow for the installation of an additional heater such as a pump compartment heater without draining the coolant system.

ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. This pump heat exchanger shall circulate water from the fire pump to the heat exchanger thereby reducing the temperature of the coolant for the engine. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant.

TRANSMISSION

The drive train shall include an Allison model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Allison approved transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

The transmission gear ratios shall be:

1st 3.49:1
2nd 1.86:1
3rd 1.41:1
4th 1.00:1
5th 0.75:1
6th 0.65:1 (if applicable)
Rev 5.03:1

TRANSMISSION COOLING SYSTEM

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

TRANSMISSION DRAIN PLUG

The transmission shall include an original equipment manufacturer installed magnetic oil drain plug.

AUTOMATIC NEUTRAL

The transmission shall be provided with an automatic neutral. When the parking brake is applied the transmission automatically returns to neutral.

TRANSMISSION FLUID

The transmission shall include two (2) internal oil filters and Allison approved transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

TRANSMISSION SHIFT SELECTOR

An Allison GEN V pressure sensitive range selector touch pad shall be provided and located on the tunnel to the right of the driver.

The shift selector shall provide an indicator on the digital display and shall alert the driver/operator when a specific maintenance function is required.

PTO LOCATION

The transmission driven power take off (PTO) shall be mounted in the 1:00 o'clock position.

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select five (5) speeds of operation. The sixth speed over drive shall be available with the activation of the mode button on the shifting pad.

NOT RECOMMENDED ON ISL ENGINES

TRANSMISSION PROGRAMMING

The EVS Vocation Package Number 198 for the fire service for this apparatus as a Pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector which requires re-selecting the drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. The transmission will detect the pump engaged signal and automatically select or deselect fourth gear lock-up. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

A nine (9) pin diagnostic connector will be provided.

The trans module shall contain the following circuits:

Function ID	Description	Wire Assignment
C1	PTO Drive Interface Output 1	142
J	Fire Truck Pump Mode (4th Lockup)	122/123
C	Range Indicator	145 (4th)
G1	PTO Drive Interface Output 1	130
	Signal Return	103

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints.

The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1098 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

FUEL SYSTEM

The fuel tank shall have a capacity of fifty (50) gallons/one hundred eighty-nine (189) liters and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length. The tank shall offer:

- A vent port which will facilitate venting to the top of the fill neck for rapid filling without any “blow-back”
- Two (2) 2” NPT fill ports for left and right hand fill with a .5” NPT drain plug centered side to side 9" from the front of the tank
- A roll over ball check vent for temperature related fuel expansion and draw
- A design including dual draw tubes and sender flanges
- A baffled design and shall be constructed of steel

- A black Powder Coated exterior to ensure corrosion resistance

The fuel tank shall be mounted below the frame, behind the rear axle. There shall be two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank, allowing the tank to be easily lowered and removed for service purposes.

The strap hanger material shall be stainless steel. No Exceptions.

For isolation of vibration and movement, rubber isolating pads shall be provided between the tank and the hanger strap assemblies. The tank straps shall be attached to rubber coated cross members which help isolate the tank from frame flex.

Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

All fuel lines shall be connected with steel fittings with all fittings pointed towards the right side (curbside) of the chassis.

The chassis fuel lines shall feature an additional 4' of length provided so the tank can be easily lowered and removed for service purposes which shall be coiled and secured at the top of the tank.

FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be black aramid braided lines with a fiber outer braid. The fuel lines shall be connected with reusable steel fittings. Fuel line is compatible with bio-fuel blends.

FUEL SHUTOFF VALVE

Two (2) fuel shutoff valves shall be installed at the fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

FUEL COOLER

The cross flow air to fuel cooler shall be all aluminum and shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures. The fuel cooler shall be located reward of the battery box, under the frame.

The fuel cooler shall incorporate a fan for improved heat transfer.

The fuel cooler shall be mounted to the frame using hot dipped galvanized brackets. Powder coated or painted brackets shall not be acceptable. No exception.

ALTERNATOR

The charging system shall include a 320-amp Leece Neville 12-volt alternator. The alternator shall include a self-excited integral regulator.

ELECTRICAL SYSTEM

There shall be a 12-volt direct current single starting electrical system providing power to all components for the cab and chassis. The system shall feature:

- 300-degree Fahrenheit high temperature, flame retardant loom
- All SAE wiring color coded and labeled as to its function
- Wiring which is cross link with 311-degree Fahrenheit insulation
- A suppressed system in accordance with SAE J551

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload.

General protection circuit breakers will be a combination of automatic and manual reset breakers. This will provide a durability and capacity maximization of the electrical system. When required, automotive type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

EMI/RFI PROTECTION

To prevent erroneous signals from crosstalk contamination and interference, the electrical system will meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system will be used to ensure radiated and

conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

EMI/RFI susceptibility will be controlled by applying appropriate circuit designs and shielding. The electrical system will be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

ELECTRICAL HARNESSING INSTALLATION

To ensure rugged dependability, all wiring harnesses installed by the apparatus manufacturer will conform to the following specifications:

SAE J1128 - Low tension primary cable

SAE J1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring

SAE J163 - Low tension wiring and cable terminals and splice clips

SAE J2202 - Heavy duty wiring systems for on-highway trucks

NFPA 1901 - Standard for automotive fire apparatus

FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses

SAE J1939 - Serial communications protocol
SAE J2030 - Heavy-duty electrical connector performance standard
SAE J2223 - Connections for on board vehicle electrical wiring harnesses NEC - National Electrical Code
SAE J561 - Electrical terminals - Eyelet and spade type
SAE J928 - Electrical terminals - Pin and receptacle type A

For increased reliability and harness integrity, harnesses will be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into its mounting location. Routing of harnessing which requires pulling of wires through tubes will not be allowed.

Wiring will be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wiring will be color, function and number coded. Wire colors will be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires will not be allowed. Function and number codes will be continuously imprinted on all wiring harness conductors at 3.00" intervals. All wiring installed between the cab and into doors will be protected by an expandable rubber boot to protect the wiring. Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment will be installed utilizing the following guidelines:

- All wire ends not placed into connectors will be sealed with a heat shrink end cap. Wires without a terminating connector or sealed end cap will not be allowed.
- All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
- Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
- For low cost of ownership, electrical components designed to be removed for maintenance will be quickly accessible. For ease of use, a coil of wire will be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.
- Corrosion preventative compound will be applied to non-waterproof electrical connectors located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation of the plug.
- Any lights containing non-waterproof sockets in a weather-exposed area will have corrosion preventative compound added to the socket terminal area.
- All electrical terminals in exposed areas will have protective Coating applied completely over the metal portion of the terminal.
- Rubber coated metal clamps will be used to support wire harnessing and battery cables routed along the chassis frame rails.
- Heat shields will be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust will be protected by a heat shield.
- Cab and crew cab harnessing will not be routed through enclosed metal tubing. Dedicated wire routing channels will be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab will allow for easy routing of additional wiring and easy access to existing wiring.

- All braided wire harnesses will have a permanent label attached for easy identification of the harness part number and fabrication date.
- All standard wiring entering or exiting the cab will be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

BATTERY CABLE INSTALLATION

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer will conform to the following requirements:

SAE J1127 - Battery Cable
SAE J561 - Electrical terminals, eyelets and spade type
SAE J562 - Nonmetallic loom
SAE J836A - Automotive metallurgical joining
SAE J1292 - Automotive truck, truck-tractor, trailer and motor coach wiring
NFPA 1901 - Standard for automotive fire apparatus

Battery cables and battery cable harnessing will be installed utilizing the following guidelines:

- All battery cables and battery harnesses will have a permanent label attached for easy identification of the harness part number.
- Splices will not be allowed on battery cables or battery cable harnesses.
- For ease of identification and simplified use, battery cables will be color coded. All positive battery cables will be red in color or wrapped in red loom the entire length of the cable. All negative battery cables will be black in color.
- For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus will be coated to prevent corrosion.

ELECTRICAL COMPONENT INSTALLATION

All lighting used on the apparatus will be, at a minimum, a two (2) wire light grounded through a wired connection to the battery system. Lights using an apparatus metal structure for grounding will not be allowed.

An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order. The results of the tests will be recorded and provided to the purchaser at time of delivery.

DRIVER SWITCH PANEL

The driver panel to the right of the Driver's position shall include the following:

- In the upper most row it shall have the HVAC Controls, which shall include three (3) controls, the fan speed, comfort and defrost control, and temperature control. In the far right position shall be the seat belt indicator.
- In the middle section there shall be eight (8) backlit switches, the switch on the far right side shall be a high idle switch.
- In the bottom row there shall be six (6) switches. The two (2) switches in the far right location shall be the dimmer switch in the second to last switch location and the wiper controls in the last switch location.

MASTER WARNING SWITCH

A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled "Master" for identification. The switch shall feature control over all devices wired through it. Any warning device switch left in the "ON" position shall automatically power up when the master switch is activated.

ACCESSORY POWER DISTRIBUTION PANEL

An accessory power distribution panel shall be installed. The panel shall feature a covered twelve (12) blade type fuses and have a ground section; and shall be protected by a 40 amp fuse. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

Please indicate location for Power Distribution panel(s):

ACCESSORY POWER DISTRIBUTION PANEL

An accessory power distribution panel shall be installed. The panel shall feature a covered twelve (12) blade type fuses and have a ground section; and shall be protected by a 40 amp fuse. The panel shall be capable of carrying up to a maximum 40 amp load though the master switch.

Please indicate location for Power Dist Panel(s):

AM/FM/CD RADIO WITH WEATHERBAND

A radio receiver shall be located in the console. The receiver shall handle vibrations, temperature fluctuations, and humidity with ease. The front panel's protective covering shall keep out any dust and debris.

The receiver's AM and FM tuner shall feature presets for radio stations, and the Weather Band tuner shall include automatic NOAA weather for alerts to any severe weather. The receiver shall

be SiriusXM ready, PA system ready, and feature a compact disc player. A portable player jack shall be available on the front and rear of the receiver.

The receiver shall be Bluetooth-enabled for phone use and stereo control and be iPod/iPhone ready via a front USB port.

The buttons and LCD display shall feature backlighting for easy reading in all lighting conditions.

SPEAKERS

Four (4) overhead speakers shall be provided in the cab for the radio.

VEHICLE DATA RECORDER

Apparatus shall be equipped with a Class1 “Vehicle Data Recorder (VDR) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and anti-lock brake (ABS) modules mounted on the apparatus. The VDR will function per NFPA 1901-2009 sections 4.11 (Vehicle Data Recorder) utilizing the power train s J1939 data.

The VDR data shall be downloadable by USB cable to a computer using either Microsoft ™ or Apple ™ Operating Systems using Class 1/ O.E.M. supplied reporting software. The latest version of the software shall be available by contacting Class 1.

The apparatus shall be equipped with a Class1 Seat Belt Warning System” (SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and anti-lock brake (ABS) modules mounted on the apparatus. The SBW will function per NFPA 1901 14.1.3.10 (Seat Belt Warning) using the Class1 “Seat Belt Input Module” for seat occupied and belt status information.

The SBW system shall have the ability to use either normally open (NO) or normally closed (NC) switches (user selectable by “dip switches” at ground potential) for operation.
Commander Analog Gauge Composite Dash

CAB INSTRUMENTATION

The instrumentation panel within the cab shall feature a gauge panel which shall include three (3) 5"diameter information centers, telltale indicator lamps, control switches, alarms, and a LCD diagnostic panel.

The gauges shall be easy to read including red backlighting.

The instrument panel shall contain the following gauges and indictors:

The middle information center shall include:

- A programmable speedometer to read either 0 to 140 MPH or 0 to 140 KM/H
- An amber telltale lamp indicating the Check Engine
- An amber telltale lamp indicating MIL Engine Emissions System Malfunction
- A red telltale lamp indicating Stop Engine
- A tachometer gauge with 0-3,000 RPM

The right hand side information center shall include:

- A gauge to display the engine oil pressure with high and low-level indicators and stop engine alarm
- A fuel level gauge with a low fuel indicator and alarm
- An LED bar displaying 4 stages of the level for the Diesel Exhaust Fluid (DEF) with a refill indicator
- A voltage gauge with low voltage indicator
- A water temperature gauge with high water temp indicator and alarm

The left hand side information center shall include:

- A primary air PSI gauge including low air and high air warning displays
- A secondary air PSI gauge with low and high air warning indication

An LCD diagnostic display, located in the left hand side information center shall include digital readouts for the following:

- Odometer
- Transmission oil temp
- Engine oil temp
- Speedometer
- Engine hours
- Engine and transmission code
- Exhaust temp
- Engine coolant temp
- Engine oil PSI
- Turbo boost PSI
- Primary air pressure
- Secondary air pressure
- Engine load %
- Engine torque
- Battery volts

- Fuel level %
- Vehicle speed
- RPM
- DEF level
- Instant fuel economy
- Average fuel economy
- Engine hours
- Capable to record three trips, each shall be include:
    - · Trip distance
    - · Fuel economy
    - · Fuel used
    - · Idle fuel used
- The LCD screen shall also provide diagnostic capability

To promote safety, the following telltale indicator lamps will be integral to the gauge assembly and are located below the middle information center. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols. The following indicator lamps shall be located on the Telltale panel:

BLUE Indicator Lights

- High Beam Headlight

GREEN Indicator Lights

- Right Turn Indicator
- Left Turn Indicator
- Battery On (Always On)

YELLOW Indicator Lights

- Particle Filter Regeneration (DPF)
- Regeneration Inhibit (Switch Engaged)
- Air Intake Restriction
- High Exhaust System Temperature (HEST)
- Wait to Start (when applicable)
- ATC (Automatic Traction Control) (when applicable)
- Water in Fuel

RED Indicator Lights

- Low Engine Coolant Level
- Air Bag Warning (when applicable)
- Check Transmission
- High Transmission Temperature
- ABS
- Parking Brake

ALARMS

Audible steady tone warning alarm: A steady audible tone alarm will be provided whenever a warning message is present.

Alarm silence: Any active audible alarm will be able to be silenced with a button on the right side of the LCD screen.

INDICATOR LAMP AND ALARM PROVE-OUT

Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

DIAGNOSTIC PANEL

A diagnostic panel shall allow diagnostic tools such as computers to connect to various vehicle systems for improved trouble shooting providing a lower cost of ownership. The panel shall be accessible while standing on the ground and located inside the driver's door to the left of the steering column. Diagnostic switches shall allow engine and ABS systems to provide blink codes should a problem exist.

The diagnostic panel shall include:

- Engine diagnostic port
- V-Mux USB diagnostic port (when applicable)
- Engine diagnostic switch (blink codes flashed on check engine telltale indicator)
- Diesel particulate filter regeneration switch (when applicable)
- Diesel particulate filter regeneration inhibit switch (when applicable)

The enclosed diagnostic panel, accessible through the HVAC access panel shall include:

- Transmission diagnostic port
- ABS diagnostic port
- SRS diagnostic port (when applicable)

BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.
4 Battery System

BATTERIES

The single start electrical system shall include four (4) 1000 CCA batteries.

The batteries shall feature:

- A 200 minute reserve capacity
- 4/0 dual path starter cables per SAE J541
- Heat shrink and sealant encapsulated ends on the cables
- Maintenance free

BATTERY COMPARTMENTS

A well ventilated battery storage compartment shall house the batteries on the officer and driver side of the chassis and shall be located so as to offer easy access to the batteries when the cab is tilted.

The each battery compartment shall feature a hot dipped galvanized battery box and cover.

BATTERY CABLES

The starting system shall include cables which shall be protected by a 275-degree F, minimum high temperature flame retardant loom.

The cables shall be in a loom to help keep out dirt, dust and debris.

BATTERY JUMPER STUD

The starting system shall include battery jumper studs.

These studs shall be located in the forward most portion of the driver's side lower step.

The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a marine grade two position switch, of which shall be mounted on the left side of the steering wheel adjacent to the driver's knee.

A push button type starter button shall be provided on the driver dash to the left of the steering wheel.

The starter button shall only operate when both the master battery and ignition switches are in the “ON” position.

POWER & GROUND STUD

An electrical distribution panel shall include two (2) power studs. The studs shall be a minimum of 1/4" and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40-amp battery direct load. One (1) power stud shall be capable of carrying up to a 15-amp ignition switched load. The two (2) power studs shall share one (1) 1/4" ground stud.

GROUND LIGHTS

Each door shall include a Whelen 3SC0CDCR LED NFPA compliant ground light mounted to the underside of the cab step below each door.

Each light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.

GROUND LIGHT ACTIVATION

The ground lights shall activate when the park brake is engaged.

CAB STEP LIGHTING

One (1) LED light shall be mounted to the riser of the middle cab step, a total of eight (8) step lights for the cab, in accordance with NFPA.

Each light shall include a polycarbonate lens and shall be contained in a housing which is vibration welded with a bulb which shall be shock mounted. Each step light shall not be any larger than 3" in diameter.

STEP LIGHT ACTIVATION

The step lighting shall be activated by opening any of the cab doors on the respective side.

INTERIOR DOOR WARNING LIGHTS

The interior of each door shall include two (2) 15" Weldon Amber Direct Flash LED warning light located on the door, one shall be mounted above the window and one shall be mounted below the interior grab handle. Each light shall activate with a flashing pattern when the door is in the open position to serve as a warning to oncoming traffic.
DOOR JAMB WARNING LIGHTS

ENGINE COMPARTMENT LIGHTING

Two (2) LED lights shall be mounted to the engine compartment in such a fashion as to provide as much light as possible to the engine compartment area. The engine compartment lighting shall activate with the tilting of the cab.

INTERIOR OVERHEAD CAB LED LIGHTING

Each cab door shall include a dual red and white LED lamp. There shall be one (1) light centered over each of the Driver and Officer's seat and one centered over each crew door.

The clear lamp shall illuminate with the opening of each respective door with both the red and clear portions of the lamp activated by individual lighted switches on each lamp.

ADDITIONAL DOME LIGHT

One (1) additional dual red and white dome lamp(s) shall be provided. The clear lamp shall illuminate with the opening of each respective door with both the red and clear portions of the lamp activated by individual lighted switches on each lamp.

ROOF TOP SPOT LIGHT

One (1) GoLight Model 20214 (black) LED spotlight with wired dash-mount remote shall be installed on the officer's side cab roof.
Go-Light Mount Officer Side - 8-11"

ROOF TOP SPOT LIGHT

One (1) GoLight Model 20214 (black) LED spotlight with wired dash-mount remote shall be installed on the driver's side cab roof.
Go-Light Mount Driver Side - 8-11"

DO NOT MOVE APPARATUS/ HAZARD LIGHT

The front headliner of the cab shall include a flashing red Whelen 500 Series LED light clearly labeled "Do Not Move Apparatus".

The flashing red light shall be located centered left to right for greatest visibility.

The light shall be interlocked for activation when either a cab door is not firmly closed, or an apparatus compartment door is not closed, and the parking brake is released.

DOOR OPEN ALARM

There shall be an alarm interlocked for activation when the parking brake is released and either a cab door or apparatus compartment door is not completely closed.

BACK-UP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

HAAS ALERT / HA-5

R2V (Responder-to-Vehicle) with HAAS ALERT R2R (Responder-to-Responder) Capability

HAAS Alert Model Number “HA-5” shall be provided.
The device shall: be constructed of high strength, impact resistant, RoHS compliant ASA Plastic; have IP65 ingress protection; include a cellular modem that connects to commercially available cellular networks to transmit and receive data to/from the HAAS Alert Safety Cloud™ and include a cellular network data plan that shall; send vehicle GPS location, speed, course, acceleration, and emergency lights status (e.g., “on” or “off”) to the HAAS Alert Safety Cloud every two (2) seconds while the vehicle is moving with e-master activated; send changes in the emergency lights status to the HAAS Alert Safety Cloud; be connected to the E-Master or emergency lights master via a minimum of 22-gauge wire; be connected to the vehicle’s main battery via a minimum of 20-gauge wire so that it receives constant power; be connected to the vehicle’s ground via a minimum of 20-gauge wire; have a parasitic shut off that turns off the device when the vehicle’s battery voltage falls below 12V; be mounted inside the cab on the dashboard, within 10 feet of the officer’s seat and with a clear view of the sky. The device shall

be upgradeable to other communication technologies such as, at minimum; 5G, 5.9 band, and FirstNet.

The device shall utilize the HAAS Alert Safety Cloud to send digital R2V (Responder-to-Vehicle) alerts to nearby civilian drivers via in-dash infotainment and IVI (In-vehicle Infotainment) units, Waze and other popular consumer navigation applications when the vehicle is en-route with emergency lights engaged; utilize the HAAS Alert Safety Cloud to send digital R2V alerts to nearby civilian drivers via in-dash infotainment and IVI (In-vehicle Infotainment) units, Waze and other popular consumer navigation applications when the vehicle is on-scene with emergency lights engaged; has the ability to utilize the HAAS Alert Safety Cloud to receive digital R2R (Responder-to-Responder) alerts when the vehicle is en-route with emergency lights engaged and other responding emergency vehicles are in close proximity; have a port that connects to a compatible peripheral device to communicate R2R alerts to vehicle passengers. The device shall be able to communicate across all manufacturer brands.

The device shall have a companion, password-protected, web-based dashboard that provides authorized users with a map-based visualization of real-time vehicle location, emergency response status (i.e., “responding”, “on-scene”, “ready”, “offline”) with the ability for expanded attribution, vehicle speed and course, vehicle time-to-scene information, and vehicle time-on-scene information.

Dimensions – Length, Width, Height (Inches): 5.4” x 2.7” x 1.3"
Input Voltage - Power: 12.5V to 15V
Input Voltage - Lights Indicator: 12V to 15V
Amperage: 120 mA peak draw
Operating Temperature Range: -40℃ to 85℃
Weight (Ounces): 7 oz.

HAAS - 5 Year Subscription

FRC Inview 360 Camera System

The **inView 360™** provides the driver with split screen view. The bird's-eye view is always visible providing a 360 view around the apparatus. This unique view allows the operator to see pedestrians and obstacles in close proximity to the apparatus. The second view on the display switches between front/left/right/rear views depending on the operational conditions. The system is networked between the turn signals, and vehicle reverse so the screen automatically switches to left, right, and rear viewing when turning or backing up.

CAMERA MONITOR MOUNT

The drivers monitor for the camera systems shall be mounted center mounted overhead.

SIREN / SPEAKER / WARNING LT PACKAGE

ELECTRIC SIREN AND CONTROL

One (1) Tomar model #940L-SIREN-R electronic siren shall be mounted in the cab. This unit shall feature an electronic air horn, wail, yelp, hi-lo and shall have a hard wired PA microphone.

The siren shall be able to control the light bar, LSTICK, and auxiliary scene lighting.

SPEAKER

One (1) Tomar 100-watt speaker, Model #SPK100, shall be installed. The speaker shall feature a Neodymium driver and a high strength composite housing that is chemical resistant and maintains rigidity at high temperatures.

SPEAKER

One (1) stainless steel grille shall be installed on the speaker.

SPEAKER LOCATION

The siren speaker shall be installed on the apparatus bumper extension, as determined by the body manufacturer.

AUXILIARY SWITCH BOX

One (1) Tomar Digital Switch Box for added auxiliary light control shall be provided.

FEDERAL MECHANICAL SIREN

One (1) Federal Signal Q2B mechanical siren, model Q2B-012NNSD, shall be fully recess mounted into the left side of the front bumper. The grille will be outside the bumper. The "Q" siren shall feature a highly polished chrome body and grille. The siren's distinctive mechanical wail sound shall produce 123 db at 10'.The siren control switch(es) shall be installed in the cab.

SIREN CONTROL

One (1) foot switch shall be provided on the driver's side of the cab floor to activate the Federal Signal Q2B siren.

SIREN BRAKE

Two (2) push button siren brake switches for the Federal Signal Q2B siren shall be provided, one (1) on the driver's side dash and one (1) on the officer's side dash.

LIGHTBAR

One (1) Tomar Black Widow light bar shall be included with the apparatus cab. The light bar shall be a model 970B-72DTP-RR and shall be mounted on the roof of the cab, towards the front, above the windshield.

The light bar shall feature:

- A 72" light bar designed for high performance
- Full dual color Red/ White LED modules
- High power take downs and alleys
- T792HL Preemption Traffic emitter
- Steady Burn Modules- RED
- Designed in accordance with NFPA Zone A requirements

LIGHTBAR ACTIVATION

The front upper light bar shall be activated through a switch on the driver's side console.

>>Use Tomar Siren Controller

UPPER REAR WARNING LIGHTS

One (1) pair of Revolution Series Dual Color LED lights shall be installed on the upper rear of the body.

Black Bezels shall be included (P/N R79-BZ-B)

SCENE LIGHT SWITCHING

A scene light switch with indicator shall be installed on the cab dash and on the pump panel to control the rear scene light(s). The switches shall be wired to operate in a three-way configuration to allow the light(s) to be controlled from either location regardless of switch position. The switches shall be labeled "REAR SCENE".

SCENE LIGHT SWITCHING

The rear scene lights shall activate automatically upon placing the transmission into reverse.

The driver side warning/scene light shall be a Tomar Model R79LVD13-RAW-01 , a R79 Revolution-series red/ amber warning light and a perimeter light with a split red/clear non-optic polycarbonate lens.

The officer side warning/scene light shall be a Tomar Model R79LVD13-RAW-01 , a R79 Revolution-series red/ amber warning light and a perimeter light with a split red/clear non-optic polycarbonate lens.

UPPER SIDE FRONT WARNING LIGHTS

One (1) one pair of Revolution Series Dual Color LED lights shall be installed on the upper front sides of the body.

Black Bezels shall be included (P/N R79-BZ-B)

SCENE LIGHT SWITCHING

A scene light switch with indicator shall be installed on the cab dash and on the pump panel to control the left side scene light(s). The switches shall be wired to operate in a three-way configuration to allow the light(s) to be controlled from either location regardless of switch position. The switches shall be labeled "LEFT SCENE".

SCENE LIGHT SWITCHING

A scene light switch with indicator shall be installed on the cab dash and on the pump panel to control the right side scene light(s). The switches shall be wired to operate in a three-way configuration to allow the light(s) to be controlled from either location regardless of switch position. The switches shall be labeled "RIGHT SCENE".

The driver side warning/scene light shall be a Tomar Model R79LVD13-RW-01 , a R79 Revolution-series red warning light and a perimeter light with a split red/clear non-optic polycarbonate lens.

The officer side warning/scene light shall be a Tomar Model R79LVD13-RW-02 , a R79 Revolution-series red warning light and a perimeter light with a split red/clear non-optic polycarbonate lens.

UPPER SIDE REAR WARNING LIGHTS

One (1) one pair of Revolution Series Dual Color LED lights shall be installed on the upper rear sides of the body.

Black Bezels shall be included (P/N R79-BZ-B)

The driver side warning/scene light shall be a Tomar Model R79LVD13-RW-01 , a R79 Revolution-series red warning light and a perimeter light with a split red/clear non-optic polycarbonate lens.

The officer side warning/scene light shall be a Tomar Model R79LVD13-RW-02 , a R79 Revolution-series red warning light and a perimeter light with a split red/clear non-optic polycarbonate lens.

INBOARD WARNING LIGHTS

One (1) pair of Whelen model M6 LED warning lights shall be installed, one each side one the front of the chassis cab, in the inboard warning light position. The dimensions of the lights shall be 4-5/16" x 6-3/4".

The driver side warning light shall be a Tomar Model R46D-W-RW-03 red Super-LED^{TM} with color lens.

The officer side warning light shall be a Tomar Model R46D-W-RW-04 red Super-LED^{TM} with color lens

OUTBOARD HEADLIGHT WARNING LIGHTS

One (1) pair of Tomar model R46 LED warning lights shall be installed, one each side one the front of the chassis cab, in the outboard position, below the headlights. The dimensions of the lights shall be 4-5/16" x 6-3/4".

The driver side warning light shall be a Tomar Model R46D-W-RW-03 red Super-LED^{TM} with color lens

The officer side warning light shall be a Tomar Model R46D-W-RW-04 red Super-LED^{TM} with color lens

INTERSECTION WARNING LIGHTS

One (1) pair of Tomar model R46 LED warning lights shall be installed one each side of the chassis cab. The dimensions of the lights shall be 4-5/16" x 6-3/4".

The driver side warning light shall be a Tomar Model R46D-W-RW-02 red and white with clear lens

The officer side warning light shall be a Tomar Model R46D-W-RW-02 red and white with clear lens

Each light shall be mounted with a Tomar Model R46-BZ-B black flange.

LOWER MID-BODY WARNING LIGHTS

One (1) pair of Tomar model iLED LED warning lights, model RSDH-RW-01, shall be installed , one each side of the apparatus, mid-body in the rub rail.

A black bezel is included.

Will only fit in EXT rub rail WITHOUT bezel

The driver side warning light shall be a Tomar Model iLED, RSDH-RW-01 wide-angle split red/clear LED with clear lens.

The officer side warning light shall be a Tomar Model iLED, RSDH-RW-02 wide-angle split red/clear LED with clear lens.

LOWER REAR SIDE WARNING LIGHTS

One (1) pair of Tomar model iLED LED warning lights, model RSDH-RW-01, shall be installed , one each side of the apparatus, towards the rear of the body.

A black bezel is included.

Will only fit in EXT rub rail WITHOUT bezel

The driver side warning light shall be a Tomar Model iLED, RSDH-RW-01 wide-angle split red/clear LED with clear lens.

The officer side warning light shall be a Tomar Model iLED, RSDH-RW-02 wide-angle split red/clear LED with clear lens.

LOWER REAR WARNING LIGHTS

One (1) pair of Tomar model R46 LED warning lights shall be installed, one each side on the lower rear of the apparatus body. The dimensions of the lights shall be 4-5/16" x 6-3/4".

LOWER REAR WARNING LIGHT OVERRIDE- REVERSE MODE

The Light fixture shall override to white when the vehicle is placed in to reverse mode.

The driver side warning light shall be a Tomar Model R46D-W-RW-01 red and white with clear lens

The officer side warning light shall be a Tomar Model R46D-W-RW-02 red and white with clear lens

12-VOLT ELECTRICAL SYSTEM

LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS

The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA standards.

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for the protected circuit. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. The wiring and wiring harness and insulation shall be in conformance to applicable SAE and NFPA standards. The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be protected in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer's instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels.

The wiring between the cab and body shall be joined using Deutsche type connectors or an enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. All connections shall be crimp-type with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system.

Any electrical junction or terminal boxes shall be weather resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in a junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat, liquid contaminants and damage. Wiring shall be uniquely identified every three-inches (3") by color coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901 standards.

The electrical circuits shall be provided with low voltage overcurrent protective devices. Such devices shall be accessible and located in required terminal connection locations or weather resistant enclosures. The overcurrent protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

The electrical system shall include the following:

- Electrical terminals in weather exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applicable to all terminal plugs located outside of the cab or body.
- The electrical wiring shall be harnessed or be placed in a protective loom.
- Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.
- Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.
- A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.
- All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

The warning lights shall be switched in the chassis cab with labeled switches in an accessible location. Individual rocker switches shall be provided only for warning lights provided over the minimum level of warning lights in either the stationary or moving modes. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. The warning light switches shall be of the rocker type. For easy nighttime operation, an integral indicator light shall be provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and "call for the right of way". When the parking brake is applied, a "blocking right of way" system shall automatically activate per requirements of the applicable NFPA standards. All "clear" warning lights shall be automatically turned off upon application of the parking brake.

NFPA REQUIRED TESTING OF ELECTRICAL SYSTEM

The apparatus shall be electrically tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of the applicable NFPA standards. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a failed test.

2. Alternator performance test at idle:

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system is permitted during this test. However, if an alarm sounds due to excessive battery discharge, as detected by the system requirements in the NFPA standards, or a system voltage of less than 11.7 volts dc for more than 120 seconds is present, the test has failed.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12 volt system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

NFPA REQUIRED DOCUMENTATION

The following documentation shall be provided on delivery of the apparatus:

a. Documentation of the electrical system performance tests required above.

b. A written load analysis, including:

1. The nameplate rating of the alternator.

2. The alternator rating under the conditions.

3. Each specified component load.

4. Individual intermittent loads.

WEATHER RESISTANT ELECTRICAL JUNCTION BOX

The electrical junction or terminal boxes shall be weather resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required. The main body junction panel shall be located in the pump compartment.

DASH MOUNTED EMERGENCY ELECTRICAL SWITCH PANEL

An electrical switch panel shall be designed and mounted in the cab dash area as furnished with the chassis. All switches shall be provided with backlighted snap-in legend inserts.

SWITCHES

All emergency light switches shall be lighted, rocker style. Switches shall be internally lit when the switch circuit is in the on position. A plug-in identification label is to be provided and installed adjacent to each rocker switch with backlighting provided behind the label.

An internally lighted switch shall be provided and wired through a heavy-duty relay to activate power to the emergency lights. The emergency lights shall be activated by a single "MASTER SWITCH" on the electrical console.

BATTERY CHARGER

One (1) Kussmaul Autocharge 2000 model #091-237-12, 18 amp fully automatic high output battery charger shall be wired to the 12 volt battery system. The charger unit shall be mounted in a clean dry area and will be accessible for service and/or maintenance.

BATTERY CHARGER DISPLAY

One (1) Kussmaul 091-39-IND dual battery bank voltage display shall be supplied with the charger.

AUTO-EJECT

A Kussmaul "Super Auto-Eject" 20-amp automatic disconnect device shall be provided and installed on the 110 volt shoreline connection complete with weatherproof cover and matching plug. The Auto-Eject shall be activated by the chassis starter switch to disconnect the plug. The Super Auto-Eject shall be completely sealed to prevent contamination of the mechanism by inclement weather and road conditions. The Super Auto-Eject shall have an internal switch to open and close the AC circuit after the mating connector is inserted and before the connector is removed.

SHORE POWER PLUG

The shore power plug shall be located at the left side of the rear body panel.

AIR HORN

One (1) 24.5" Stuttertone chrome plated air horn shall be recess mounted into the right side of the front bumper. An air protection valve shall be provided in the air horn piping that will not allow the chassis air brake system to drop below 90 PSI.

AIR HORN FOOT SWITCH

One (1) foot switch shall be installed to activate the air horn system on the driver's side of the floor.

AIR HORN SWITCH

One (1) switch shall be installed to activate the air horn system on the officer's side of the cab dash.

12 VOLT POWER SOURCE

One (1) 12 volt power and ground connection rated at 30 amps shall be provided on the apparatus for the installation of a mobile two-way radio.

The power source shall be run through the chassis master battery switch and shall be deactivated when the master switch is in the "OFF" position.

PUMP ENCLOSURE LIGHTS

One (1) LED work light shall be provided in the pump enclosure.

The control switch shall be mounted on the light head.

LIGHT MOUNTING LOCATION

The mounting location for the specified light shall be on the front edge of the chassis cab roof.

LED SCENE LIGHT

A Tomar TRX-20W-FS brow light shall be provided and installed below the light bar. The light shall be powder coated black.

SCENE LIGHT SWITCHING

A scene light switch with indicator shall be installed on the cab dash and on the pump panel to control the front scene light(s). The switches shall be wired to operate in a three-way configuration to allow the light(s) to be controlled from either location regardless of switch position. The switches shall be labeled "FRONT SCENE".

HAND LIGHTS

All NFPA required portable hand lights supplied by the Customer must be installed before the apparatus is placed into service.

INTERCOM SYSTEM

The vehicle shall be equipped with a Firecom 5100D intercom master station. The system comes standard with connections for up to six (6) positions. Additional positions can be added through daisy chaining.

This system can operate with one (1) mobile radio. Connection of this system to the mobile radio is not included, unless specified.

INTERCOM HEADSET

Two (2) UH-51 Under-The-Helmet-Headset shall be provided with the intercom system. The red PTT button activates radio transmit. The mic is always live for intercom communication. Appropriate for driver or officer positions.

INTERCOM PLUG IN MODULE

Two (2) HM-10 plug-in module for with any single-plug headset at interior positions in the apparatus shall be provided.

INTERCOM HEADSET

Two (2) UH-54 under-the-helmet headset shall be provided with the system. The headsets are voice activated for intercom communication only.

INTERCOM PLUG IN MODULE

Two (2) HM-10 plug-in module for with any single-plug headset at interior positions in the apparatus shall be provided.

HEADSET HANGER HOOK

Four (4) headset hanger hooks shall be provided and installed in the cab for storage of the headsets while not in use.

INTERCOM INTERFACE CABLE

One (1) intercom interface cable shall be provided to connect the intercom to the customer supplied/installed radio. The cable shall have the ability to connect to a single radio. The customer to provide make and model of radio for proper interface cable.

>> Shall be a BK, model KNG, remote head

MARKER LIGHTS

LED marker lights shall be installed on the vehicle in conformance to the Department of Transportation requirements.

LICENSE PLATE BRACKET

One (1) stainless steel license plate bracket shall be provided at the rear of the apparatus. The bracket shall have a LED light.
S.O.R. / Tomar Rr DOT LED Ltng Pkg R46

TAIL LIGHTS

One (1) pair of Tomar R46L-STT LED tail/brake lights shall be provided. The rectangular 4"x6" lights shall be red.

TURN SIGNALS

One (1) pair of Tomar R46L-TURN LED turn signals with populated sequential chevron arrow shall be provided.

BACKUP LIGHTS

The back-up lights shall be integrated in to the rear lower warning light. The fixture shall override to white when teh vehicle is placed in reverse.

FOUR LIGHT HOUSING

One (1) pair of black plated tail light housings shall be supplied. Each housing shall be designed to hold four (4) Revolution 4x6 rear lights located at the lower rear corners of the body.

Model R46-BZ4-B

MID BODY LED TURN SIGNALS

One (1) pair of TechNiq S17 amber mid body LED marker / turn signals shall be provided. The location of the turn lights shall be at mid-body near the rear wheel axle.

FRONT BUMPER GROUND LIGHTS

Two (2) ground lights LED lights shall be installed under the front bumper.

>>Tomar 970-FR3WNF-13F Light

>>RECT-SX-BLACK Mounting Hardware

PUMP PANEL GROUND LIGHTS

Two (2) LED ground lights shall be installed under the pump panel running boards. One (1) light shall be located on the driver's side and one (1) light located on the officer's side of the apparatus.

>>Tomar 970-FR3WNF-13F Light

>>RECT-SX-BLACK Mounting Hardware

REAR STEP GROUND LIGHTS

Two (2) LED ground lights shall be installed under rear step of the apparatus.

>>Tomar 970-FR3WNF-13F Light

>>RECT-SX-BLACK Mounting Hardware

REAR BODY GROUND LIGHTS

Two (2) LED ground lights shall be installed under the compartments located behind the rear wheels. One (1) light shall be located on the driver's side and one (1) light located on the officer's side of the apparatus.

>>Tomar 970-FR3WNF-13F Light

>>RECT-SX-BLACK Mounting Hardware

The ground lights shall automatically activate when the parking brake is applied.

REAR TAILBOARD LIGHTS

Two (2) LED step lights with clear lens shall be installed to illuminate the step surfaces at the rear of the apparatus body.

The step/walkway light switch shall be installed and wired to the parking brake.

SCENE LIGHT

Four (4) Tomar TRX-FL-10C-13 work/scene light shall be provided. The fixture shall be manufactured from cast aluminum and shall be machined and tapped to allow for mounting of accessories on all 5-faces of the fixture. The fixture must be rated to withstand both submission as well as high pressure spray, and shall conform to both IP68 and IP69K standards. The fixture must be capable of withstanding 21.2 Grms vibration and must be capable of operation in environments from -40C to + 85C.

>>Two (2) left and (2) right side of the body

The fixture shall have a black housing, black rubber gasket and a black trim bezel.

DOOR OPEN SYSTEM

Switches shall be installed on the left side body doors designed to activate the door open light in the driver's area of the cab. A separate light labeled "Left Body Doors" shall be installed in the

cab. The door open light shall operate only when the parking brake is released.

DOOR OPEN SYSTEM

Switches shall be installed on the right side body doors designed to activate the door open light in the driver's area of the cab. A separate light labeled "Right Body Doors" shall be installed in the cab. The door open light shall operate only when the parking brake is released.

DOOR OPEN SYSTEM

Switches shall be installed on the rear body doors designed to activate the door open light in the driver's area of the cab. A separate light labeled "Rear Body Doors" shall be installed in the cab. The door open light shall operate only when the parking brake is released.

DOOR OPEN SYSTEM

Switches shall be installed on the roof compartment doors designed to activate the door open light in the driver's area of the cab. A separate light labeled "Roof Compartment Doors" shall be installed in the cab. The door open light shall operate only when the parking brake is released.

DOOR OPEN/HAZARD WARNING ALARM

A door open/hazard warning alarm shall be installed. The audible alarm shall activate when an open door is detected upon release of the parking brake. The alarm shall have a distinct noise to avoid conflict with other cab mounted alarms.

TRAFFIC ARROW LIGHT

One (1) Tomar Model #LSTICK-14TD6-B Traffic Advisor shall be installed. The light shall be equipped with six (6) LED lights measuring 29.25" in length. The unit shall be mounted at the rear of the apparatus body. The Traffic Advisor control head shall be mounted inside the cab and be accessible by the driver and officer.

The traffic arrow light shall be surface mounted below the rear intermediate step of the apparatus body.

CHASSIS MODIFICATION

FLUID DATA PLAQUE

One (1) fluid data plaque containing required information shall be provided based on the applicable components for this apparatus, compliant with NFPA Standards:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Drive axle lubricant
- Power steering fluid
- Pump transmission lubrication fluid
- Other NFPA applicable fluid levels or data as required

Location shall be in the driver's compartment or on driver's door.

DATA & WARNING LABELS

HEIGHT LENGTH & WEIGHT

A highly visible label indicating the overall height, length, and weight of the vehicle shall be installed in the cab dash area.

NO RIDE LABEL

One (1) "NO RIDERS" label shall be applied on the vehicle at the rear step area or other applicable areas. The label shall warn personnel that riding in or on these areas, while the vehicle is in motion is prohibited.

CAB SEATING POSITION LIMITS

One (1) label shall be installed in the cab to indicate seating positions for firefighters. A weight allowance of 250 pounds for each shall be factored into the gross vehicle weight rating of the chassis.

HELMET WARNING TAG

One (1) label shall be installed in the cab, visible from each seating position. The label shall read "CAUTION: DO NOT WEAR HELMET WHILE SEATED." Helmets must be properly stowed while the vehicle is in motion according to the current edition of NFPA 1901.

REAR TOWING PROVISIONS

There shall be two tow eyes furnished under the rear of the body and attached directly to the chassis frame rails. There shall be a reinforcement spreader bar connecting the two tow eyes. Tow eyes are to be constructed of 3/8" plate steel with a 4" I.D. hole, large enough for passing through a tow chain end hook.

The tow plates shall be painted black.

BUMPER

The chassis shall feature a heavy duty bumper constructed from ASTM A36, 1/4" thick steel and painted primary job color. The bumper shall be 12" high by 102" wide with two inch (2") flanges and chamfered corners.

Integral heavy duty steel bumper "wings" shall extend from the bumper to the cab.

The bumper shall be mounted to a twelve inch (12") long chassis frame extension.

A contoured apron / gravel shield fabricated from NFPA compliant, slip-resistant polished aluminum shall enclose the area between the bumper and the cab.

HIGH ANGLE OF APPROACH BUMPER

The standard front bumper design shall be modified to be angled from front to back to accommodate areas where a high angle of approach is required.

>>The rear portion of the bumper shall be no more than 10" wide and shall not extend down past the bottom of the cab.

FRONT BUMPER COMPARTMENT

One (1) recessed fire hose compartment constructed from smooth aluminum shall be installed in the center of the front bumper extension. Water drain holes shall be drilled in the bottom.

BUMPER COMPARTMENT DOOR

The center section of the front bumper shall be cleanly and precisely cut out. This section shall then be re-attached with a heavy duty stainless steel piano hinge at the bottom and two (2) latches shall be installed to hold the center section in the closed position. An aluminum tread plate top cover for the center front bumper compartment shall be supplied. The top cover shall have a stainless steel hinge at the rear and a hold open device. When the center-hinged section of the front bumper is released the top cover may be opened providing quick and easy access to the front bumper compartment. The front bumper extension assembly shall be adequately re-enforced to accommodate the hinged front face bumper compartment door.

>>A cable stop shall be installed to not allow the door to go below horizontal and below the bumper.

COMPARTMENT MATTING

The bumper compartment floor shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking units, 12 x 12 square by 3/4" thick. This material shall be resistant to temperature, ultra-violet radiation, mechanical impacts, chemical actions and corrosion free.

CORNERING LIGHTS

There shall be two (2) Whelen M6 LED cornering lights which shall be mounted, one (1) on each of the driver and officer bumper tails for additional lighting when turning a corner. Each lamp shall illuminate when the respective turn signal is activated.

TOW EYES

Two (2) 3" tow eyes shall be mounted to the bumper extension through the front face of the bumper. The tow eyes shall be steel and shall be painted coated black.

HUB AND LUG NUT COVERS

The apparatus shall have chrome or stainless steel hub and lug nut covers on the front and single rear axles.

TIRE PRESSURE INDICATOR

There shall be a tire pressure indicator, p/n RWTG1235, at each tire's valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire.

EXHAUST HEAT SHIELD

A heat shield shall be installed under the body in the areas where the exhaust system is routed.

REAR MUD FLAPS

One (1) pair of black mud flaps shall be installed behind the rear wheels.

SCBA BRACKET

One (1) Zico SCBA bracket shall be provided for installation on the vertical surface of the rear cab wall. An NFPA approved cylinder retention strap shall be supplied.

>>Driver's side PAC Board, as low as possible.

REFERENCE BOOK STORAGE

One (1) Mapbox shall be built per the attached.

The cabinet's exterior finish shall match the interior finish of the chassis cab.

>>Black Line-X

The cabinet's interior shall have a natural finish.

AIR TANK DRAIN CABLE EXTENSION

Five (5) cable from the spring loaded air tank drain shall be routed and attached to the outer edge of the apparatus for ease of access. The 1/8" braided steel cable shall allow accumulated moisture in the air brake system to be easily drained. The cable shall be installed so that maximum ground clearance is maintained.

AUXILIARY FIRE PUMP

AUXILIARY FIRE PUMP SPECIFICATIONS

A Darley portable pump model number 1-1/2AGE24K shall be provided. The medium pressure, medium volume pump shall meet the following performance requirements:

20 gpm (76 L/M) @ 310 psi (21.4 bar)
140 gpm (530 L/M) @ 145 psi (10.0 bar)
180 gpm (681 L/M) @ 80 psi (5.5 bar)

PUMP CONSTRUCTION

The pump shall be constructed with high strength aluminum alloy casing and discharge valve, aluminum alloy gear case and engine adapter, bronze impeller and wear rings, stainless steel impeller shaft, injection style packing, heat treated alloy steel helical gear and ball bearing construction.

PUMP PACKING

The plunger injection packing glands shall have the ability to be repacked in less than 10 minutes and feature a long wearing ceramic coating to minimize friction and power loss. Plastallic injected packing supplied through an external supply cylinder shall allow for equalized pressure around the pump shaft and minimize friction.

ENGINE SPECIFICATION

The pump shall be powered by a 24 horsepower, liquid cooled, Kubota diesel engine. The engine shall have a spin on oil filter, dry element air cleaner, manual compression release, 12 volt electric starter, 40 amp alternator and fuel pump.

The pump shall have dimensions of 36" long x 24" wide x 26" high and a weight of 376 pounds.

WARRANTY

The pump shall carry a three (3) year parts replacement warranty.

AUXILIARY PUMP ENGINE ENGAGED LIGHT

One (1) indicator light shall be illuminated in the chassis cab when the auxiliary fire pump engine is running. The light shall be labeled, "Pump Engine Running".

FIRE PUMP PRIMING SYSTEM

A 12 volt electrically driven, positive displacement, rotary vane type 'oil less' priming pump shall be installed.

The pump shall be capable of taking suction and discharging water with a lift of 10 feet in not more than 30 seconds with the pump dry, through 20 feet of suction hose of appropriate size. The priming system shall comply with applicable sections of NFPA standards.

FUEL SYSTEM

The fuel system for the auxiliary fire pump shall be plumbed to the chassis fuel system. There shall be a separate fuel pickup tube mounted in the chassis fuel tank specifically for a separate engine driven pump assembly.

There shall be an electric fuel pump and fuel hose furnished between the chassis fuel tank and the auxiliary pump.

ELECTRIC START SYSTEM FOR AUXILIARY FIRE PUMP

The electric start system for the auxiliary fire pump shall be connected to the chassis electrical system. There shall be an on/off switch and push to start switch located near the pump operator's position.

AUXILIARY AND MAIN FIRE PUMP PLUMBING

The auxiliary fire pump shall be plumbed to the main pump **FOAM** discharge manifold. There shall be a one-way check valve installed in the discharge lines from fire pump discharge manifold.

ENGINE THROTTLE

A electrically operated digital engine control throttle shall be installed for the pump engine. The throttle shall be furnished on the pump operator's control panel and in the cab. There shall be an engraved identification label provided to read "THROTTLE".

WATER TANK TO PUMP LINE

One (1) 2-1/2" water tank to fire pump line shall be provided with a full flow quarter turn ball valve, 2-1/2" piping, flex hose and stainless steel hose clamps. The valve control shall be accessible from the pump operation area and equipped with a nameplate on the handle.

FIRE PUMP TO WATER TANK FILL LINE

One (1) 1-1/2" fire pump to water tank refill and pump bypass cooler line shall be provided. The valve shall be a full flow quarter turn ball valve with 1-1/2" piping and flex hose to tank. The valve control handle shall have a nameplate located near the valve control.

ROSENBAUER N SINGLE STAGE PUMP

ROSENBAUER N FIRE PUMP

A Rosenbauer Model N fire pump shall be mounted and installed. The midship pump system shall have a rated capacity of 1500 GPM and shall meet all applicable sections of NFPA standards. The pump shall be constructed and mounted in accordance with the following specifications.

Pump shall deliver the percentage of rated discharge at pressures indicated below:

100% of rated capacity at 150 pounds net pressure
70% of rated capacity at 200 pounds net pressure
50% of rated capacity at 250 pounds net pressure
100% of rated capacity at 165 pounds net pressure

IMPELLER AND SHAFT

The high-grade light alloy impellers shall be accurately balanced and mounted on a stainless steel pump shaft. The shaft shall be supported by three roller bearings; two located in the gearbox and one in the suction inlet. Bearings shall be protected from water and sediment by maintenance free self-adjusting mechanical seals.

PUMP DRIVE SYSTEM

Fire pump shall incorporate high strength helical gear drive single stage transmission. Pump drive system shall be with a heavy-duty PTO system bolted directly to the chassis transmission. There shall be a heavy-duty drive shaft furnished from the PTO to the midship pump transmission.

Pump Body Material

The pump body is to be of high quality seawater resistant light alloy. All parts that come into contact with water shall be special treated light alloy or stainless steel. Heavy cast iron pumps are not acceptable.

TRIDENT PRIMER – AUTOMATIC

An automatic fire pump priming system shall be provided and installed. The system shall be oil-less type and environmentally safe. Once engaged, the system shall be fully automatic and not require any action from the pump operator/engineer when pump draft is lost. This feature provides an additional safety margin by maintaining pump flow from the available water source automatically during drafting operations. When air is introduced during a drafting operation from conditions such as whirlpools or turbulence from porta-tank refill operations, the priming system shall automatically engage to remove the air and stabilize water flow and pump pressure. For additional safety, the entire system shall operate at less than 70dBA of ambient noise.

The priming system shall engage automatically whenever the pump discharge falls below five (5) psi and shall remain engaged until a pump prime has been achieved. The priming system shall automatically disengage when a positive pump discharge pressure has been established. The electrical current draw from the chassis batteries shall not exceed four (4) amps at any given time of operation and allow for unlimited run time without causing an overheat condition for of any of the system components.

A single engagement switch shall be provided on the pump control panel that will allow the operator to engage the automatic pump priming system. There shall be a light provided on the pump control panel to indicate when the system is engaged. The pump shall be capable of taking suction and discharging water with a lift of 10 feet in not more than 30 seconds with the pump dry, through 20 feet of suction hose of appropriate size. The priming system shall comply with applicable sections of NFPA standards.

PRIMER CONTROL

A manual push button shall be provided on the pump operator's panel, for the manually priming the main pump.

PRESSURE GOVERNOR AND ENGINE-PUMP MONITORING

One (1) Fire Research InControl series TGA400 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

- Pump discharge; shown with four daylight bright LED digits more than 1/2" high
- Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- Pressure / RPM setting; shown on a dot matrix message display
- Pressure and RPM operating mode LEDs
- Throttle ready LED
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display.

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)

- No Engine Response (visual alarm only).

The program features shall be accessed via push buttons and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine.

PTO FIRE PUMP SHIFT -- STATIONARY PUMPING

The Rosenbauer power-take-off driven fire pump shall be equipped with a Hot-Shift electrically operated PTO engagement in the cab.

The system shall include applicable the NFPA standard interlocks, pump shift and OK TO PUMP indicator lights in the cab and pump panel. The fire pump system shall be equipped with an interlock system shall be provided to ensure that the pump drive system components are properly engaged in the pumping mode of operation so that the pumping system can be safely operated from the pump operator's position in a stationary pumping mode.

FIRE PUMP COOLING

The fire pump shall be equipped Rosenbauer thermal bypass cooling system. The system shall automatically dump water through a discharge line to the ground when pump water temperature exceeds 140 degrees.

APPROVED PUMP PANEL DRAWING

A pump panel drawing shall be provided for approval to the fire department prior to building the pump panel. The drawing will show the primary controls and gauges and not every switch or label.

Pump panel drawing shall be based on model of pump, manifolds, driveline angles, exhaust layout and other engineering concerns. The pump panel drawing is configured based on the pump and manifold design specified and in some cases changes to the lay out will be limited. Any changes made by the department are subject to engineering approval.

Delays in pump panel drawing approval may delay the completion of the apparatus.

PUMP ANODES

There shall be sacrificial, zinc anodes in the pump steamer ports which shall protect the pump and piping from electrolysis. These anodes shall also act as screens.

STAINLESS STEEL PUMP PLUMBING

PUMP PLUMBING SYSTEM

The fire pump plumbing system shall be of rigid stainless steel pipe or flexible piping with stainless steel fittings. Mechanical grooved couplings shall be installed to permit flexing of the plumbing system and allow for quick removal of piping or valves for service. Flexible hose couplings shall be threaded stainless steel or mechanical grooved coupling connections.

The fire pump and plumbing shall be hydrostatically tested in compliance to applicable sections of NFPA standards. The test results shall be included in the delivery documentation.

FIRE PUMP MASTER DRAIN

The fire pump plumbing system and fire pump shall be piped to a single push-pull type master pump drain assembly.

ADDITIONAL LOW POINT DRAINS

The plumbing system shall be equipped with additional low point manually operated drain valves to allow total draining of the fire pump plumbing system. These valves shall be accessible from the side of the vehicle and labeled.

STAINLESS STEEL INTAKE MANIFOLD

The suction manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The suction manifold assembly shall have radiused sweep elbows to minimize water turbulence into the suction volute. The suction manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The stainless steel manifold assembly shall have a ten (10) year warranty.

STAINLESS STEEL DISCHARGE MANIFOLD

The discharge manifold assembly shall be fabricated with minimum of Schedule #10 Type 304 stainless steel. All threaded fittings shall be a minimum of Schedule #40 stainless steel. The discharge manifold assembly shall have radiused sweep elbows to minimize water turbulence. The manifold shall be welded and pressure tested prior to installation. The stainless steel manifold inlet shall be attached to the pump discharge and have additional brackets as required to support the discharge manifold, valves and related components.

The stainless steel manifold assembly shall have a ten (10) year warranty.

PLUMBING SYSTEM

The plumbing system shall be unpainted.

HOSE THREADS

The hose threads shall be National Standard Thread (NST) on all base threads on the apparatus intakes and discharges.

GATED 6" INTAKE -- LEFT SIDE PUMP PANEL

One (1) 6" gated suction intake shall be installed behind the left side pump panel. Intake shall be gated with an Akron Model 7960, with 9333 controller, electrically operated 6" butterfly valve, controlled at the pump operator's panel. The valve operating mechanism shall prevent movement of the valve from the fully closed position to the fully open position or vice versa, in less than three seconds. The valve control shall have a colored identification label.

A pressure dump/relief valve shall be included that is factory preset at 125 PSI and field adjustable from 75 to 250 PSI. The pressure dump/relief valve shall provide over-pressure protection for the suction hose even when the intake valve is closed. The outlet of the dump/relief valve shall be 2.5" in diameter to allow directing the discharge flow away from the pump operator's position.

An inlet fitting with 6" NST thread shall be provided, complete with a removable strainer screen.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift, to open and push down, to close.

One (1) An adapter shall be provided. Threads shall be a 4" Male NST x 6" swivel female NST.

One (1)A lightweight aluminum locking 4" Female NST cap shall be provided. A chain or cable attachment shall be also supplied.

GATED 6" INTAKE -- RIGHT SIDE PUMP PANEL

One (1) 6" gated suction intake shall be installed behind the right side pump panel. Intake shall be gated with an Akron Model 7960, with 9333 controller, electrically operated 6" butterfly valve, controlled at the pump operator's panel. The valve operating mechanism shall prevent movement of the valve from the fully closed position to the fully open position or vice versa, in less than three seconds. The valve control shall have a colored identification label.

A pressure dump/relief valve shall be included that is factory preset at 125 PSI and field adjustable from 75 to 250 PSI. The pressure dump/relief valve shall provide over-pressure protection for the suction hose even when the intake valve is closed. The outlet of the dump/relief valve shall be 2.5" in diameter to allow directing the discharge flow away from the pump operator's position.

An inlet fitting with 6" NST thread shall be provided, complete with a removable strainer screen.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift, to open and push down, to close.

One (1) An adapter shall be provided. Threads shall be a 4" Male NST x 6" swivel female NST.

One (1)A lightweight aluminum locking 4" Male NST cap shall be provided. A chain or cable attachment shall be also supplied.

WATER TANK TO PUMP LINE

One (1) 3" water tank to the rear mounted fire pump line shall be provided with a full flow quarter turn ball valve, 4" piping, and with flex hose and stainless steel hose clamps. The tank to pump

line shall be equipped with a check valve to prevent pressurization of the water tank.

The line shall be flow tested during the fire pump testing and shall meet applicable requirements of NFPA standards.

The tank to pump valve shall be controlled at the pump operator's panel.

>>Reverse operation: "In is open & out is closed"

The valve shall be an Akron 8000 Series three-inch (3") valve with a stainless ball.

The valve control shall be a manually operated pull-rod with aircraft cable control. The lever shall be locking with a polished finish. The lever shall have a 6” stroke for ease of operation.

The aircraft cable used to control the valve from the lever shall be furnished with 7/8” bulkhead and 5/16” thread on both ends. The cable end nearest the valve will have a 5/16” swivel u-joint. This cable allows for ease of maintenance and operation.

The control shall be properly identified with a color-coded name plate.

FIRE PUMP TO WATER TANK FILL LINE

One (1) 2" fire pump to water tank refill and pump bypass cooler line shall be provided. The valve shall be a full flow quarter turn ball valve with 2" piping and flex hose to tank. The valve control handle shall have a nameplate located near the valve control.

The valve shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

The valve control shall be a manually operated pull-rod with aircraft cable control. The lever shall be locking with a polished finish. The lever shall have a 6” stroke for ease of operation.

The aircraft cable used to control the valve from the lever shall be furnished with 7/8” bulkhead and 5/16” thread on both ends. The cable end nearest the valve will have a 5/16” swivel u-joint. This cable allows for ease of maintenance and operation.

The control shall be properly identified with a color-coded name plate.

MIDSHIP FIRE PUMP DRIVESHAFTS AND INSTALLATION

The midship PTO fire pump shall be installed and shall include installation of the fire pump, modification and/or fabrication of new drivelines and all pump-mounting brackets. The PTO drive shaft(s) shall be spin balanced prior to final installation.

INTAKE RELIEF/DUMP VALVE

One (1) TFT A18 series, 2-1/2" intake relief/dump valve preset at 125 psi shall be permanently

installed on the suction side of the fire pump. The valve shall have an adjustment range of 75 psi to 250 psi, and shall be designed to automatically self-restore to a non-relieving position when excessive pressure is no longer present.

Discharge side of the intake relief valve shall be plumbed away from the pump operator.

FIRE PUMP COOLING

The fire pump shall be equipped with 3/8" cooling line from the pump to the water tank. This re-circulation line shall be controlled by a pump panel control valve with nameplate label noting it as the "fire pump bypass cooler". There shall be a check valve installed in the pump cooler line to prevent tank water from back flowing into the pump when it is not in use.

CHASSIS ENGINE HEAT EXCHANGER COOLING SYSTEM

The apparatus shall be equipped with a heat exchanger for supplementary chassis engine cooling during fire pump operations. A manually opened valve, mounted at the operator's panel, shall direct water from the fire pump to the heat exchanger that is mounted in the engine radiator cooling hose. The system shall provide cooling water from the fire pump to circulate around the engine radiator coolant without mixing or coming in direct contact with the engine coolant.

A nameplate label shall be installed on the pump panel noting "engine cooling system" with "on-off" opening directions noted.

UNDERWRITERS LABORATORIES FIRE PUMP TEST

The pump shall undergo an Underwriters Laboratories Incorporated test per applicable sections of NFPA standards, prior to delivery of the completed apparatus.

The UL acceptance certificate shall be furnished with the apparatus on delivery.

FIRE PUMP TEST LABEL

A fire pump performance and rating label shall be installed on the fire apparatus pump panel. The label shall denote levels of pump performance and testing completed at factory. These shall include GPM at net pump pressure, RPM at such level, and other pertinent data as required by applicable NFPA standards. In addition, the pressure control device, tank to pump flow tests, and other required testing shall be completed.

In addition, the entire pump, suction and discharge passages shall be hydrostatically tested to a pressure as required by applicable NFPA standards. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA standards. Pump shall be free from objectionable pulsation and vibration.

If applicable, the fire pump shall be tested and rated as follows:

100% of rated capacity at 150 pounds net pressure.
70% of rated capacity at 200 pounds net pressure.
50% of rated capacity at 250 pounds net pressure.
100% or rated capacity at 165 pounds net pressure.

LEFT SIDE -- 2-1/2" GATED INTAKE

One (1) 2-1/2" gated suction intake shall be installed on left side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a ¾" drain and bleeder valve. A nameplate label and removable screen shall be installed.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

The valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

The valve shall be equipped with one (1) manually operated, swing-type manual control located adjacent the intake. The valve shall be equipped with a color-coded name plate.

RIGHT SIDE -- 2-1/2" GATED INTAKE

One (1) 2-1/2" gated suction intake shall be installed on right side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a ¾" drain and bleeder valve. A nameplate and removable screen shall be installed.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

The valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

The valve shall be equipped with one (1) manually operated, swing-type manual control located adjacent the intake. The valve shall be equipped with a color-coded name plate.

DISCHARGES

2" DISCHARGE FRONT CENTER BUMPER

One (1) 2" discharge shall be installed at front center bumper area with brass swivel outlet with 1-1/2" NST male threads. The valve control shall be on pump panel and a nameplate label provided at valve control area.

The plumbing shall be flexible hose with abrasion resistant support mountings. Auxiliary low point drains shall be provided on the discharge line.

A 3/4" quarter turn bleeder valve shall be installed.

The hose connection for the front discharge shall be swivel type located above the front bumper deck level.

The specified valve shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

One (1) manually operated swing type valve with control located adjacent the valve, shall be supplied on the specified discharge. The control handle shall be equipped with quarter-turn locking feature. The valve shall be equipped color-coded name plate.

One (1) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

TWO (2) 1-1/2" CROSSLAY DISCHARGES

Two (2) pre-connect 1-3/4" hose crosslays shall be installed over pump enclosure, with quarter turn 2" diameter ball valves. The outlets shall be a 2" NPT female swivel x 1-1/2" male NST hose threads.

The crosslay hosebeds shall have smooth aluminum sides. The hosebed decking shall be constructed with slots integrated into the hosebed floor.

Each hosebed shall provide for a minimum capacity of 200 feet of 1-3/4" diameter double jacket hose with nozzle, for hose provided by the fire department. A divider shall be installed to separate the crosslay beds.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

The specified valve shall be an Akron 8000 Series two-inch (2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control, with air craft cable control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The aircraft cable that is used to control the valve, shall be furnished with 7/8" bulkhead both ends, 5/16" threaded ends and will also require a 5/16" swivel u-joint that unhooks from the ball valve. This cable will be used for ease of maintenance and operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted gauge bezel with recessed color-coded label.

Two (2) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

CROSSLAY HINGED COVER WITH END FLAPS

The crosslay hosebed shall be equipped with a single aluminum diamond plate hinged cover with vinyl end flaps with hook & loop fasteners. The cover shall have rubber bumpers, latching devices, and lift up handle on each end of the cover.

The hosebed cover shall be labeled, "Not a Standing or Walking Surface", per NFPA.

The vinyl cover shall be black in color.

CROSSLAY HOSE BED TRIM

The crosslay hosebed shall be equipped anodized aluminum angle overlays, one on each end of the hosebed.

CROSSLAY HOSEBEDS

Crosslay discharges shall be "LOW MOUNTED" above the lower pump panel.

LEFT SIDE PUMP PANEL -- 2-1/2" DISCHARGE

Two (2) 2-1/2" discharge shall be installed on the left side pump panel area and shall be controlled by a quarter turn ball valve. The discharge shall have 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

Two (2) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

Two (2) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control, with air craft cable control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The aircraft cable that is used to control the valve, shall be furnished with 7/8" bulkhead both ends, 5/16" threaded ends and will also require a 5/16" swivel u-joint that unhooks from the ball valve. This cable will be used for ease of maintenance and operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted gauge bezel with recessed color-coded label.

Two (2) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

RIGHT SIDE PUMP PANEL -- 2-1/2" DISCHARGE

One (1) 2-1/2" discharge shall be installed on the right side pump panel area and shall be controlled by a quarter turn ball valve. The discharge shall have 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

One (1) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

One (1) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control, with air craft cable control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The aircraft cable that is used to control the valve, shall be furnished with 7/8" bulkhead both ends, 5/16" threaded ends and will also require a 5/16" swivel u-joint that unhooks from the ball valve. This cable will be used for ease of maintenance and operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted gauge bezel with recessed color-coded label.

One (1) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

RIGHT SIDE PUMP PANEL -- 4" DISCHARGE

One (1) 4" discharge shall be installed on the right side pump panel area and shall be controlled by a full flow 4" slow-close quarter turn ball valve. The discharge shall have 4" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

One (1) lightweight aluminum elbow with 30 degree slant shall be provided. Threads shall be 4" Male NST x 4" female swivel NST with rocker lugs.

One (1) 4" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series four-inch (4") valve with a stainless ball.

One (1) Akron valve equipped with an Akron Navigator 9333 controller and a 12 volt electric motor actuator shall be provided on the specified 4" discharge. The controller shall be push button type and provide position indication through a full color backlit LCD display. It shall have manual adjustment of the brightness as well as an auto-dimming option. A color-coded name plate shall be installed over the valve control.

One (1) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

RIGHT SIDE FRONT OF HOSEBED -- 2-1/2" DISCHARGE

One (1) 2-1/2" discharge shall be to the right side front of hosebed area and controlled by a quarter turn ball valve on the pump panel. The discharge shall have 2-1/2" NPT x 2-1/2" NST male hose threads. An engraved nameplate label shall be provided adjacent the control handle.

A Class 1 automatic type 3/4" bleeder valve shall be installed.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control, with air craft cable control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The aircraft cable that is used to control the valve, shall be furnished with 7/8" bulkhead both ends, 5/16" threaded ends and will also require a 5/16" swivel u-joint that unhooks from the ball valve. This cable will be used for ease of maintenance and operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted gauge bezel with recessed color-coded label.

One (1) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

REAR RIGHT SIDE -- 2-1/2" DISCHARGE

One (1) 2-1/2" discharge shall be installed on the right side rear panel of the apparatus body and shall be controlled by a quarter turn ball valve on the pump panel. The discharge shall have 2-1/2" NPT x 2-1/2" NST male hose threads. The outlet shall be equipped with an engraved nameplate label shall be installed adjacent the valve control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift to open and push down to close.

One (1) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

One (1) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

The specified valve shall be an Akron 8000 Series two and one half-inch (2-1/2") valve with a stainless ball.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

One (1) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

3" MONITOR DISCHARGE

One (1) 3" discharge shall be piped to the area over the pump enclosure with 3" NPT male threads provided. The pipe shall be equipped with Victaulic couplings (if necessary) and shall be properly secured to prevent movement when a monitor or deck gun is attached. The quarter turn ball valve shall be controlled on pump panel.

A color coded nameplate label shall be provided adjacent the valve control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift, to open and push down, to close.

The specified valve shall be an Akron 8000 Series three-inch (3") valve with a stainless ball.

Two (2) Akron valve equipped with an Akron Navigator 9335 controllers and a 12 volt electric motor actuator shall be provided on the specified 3" discharge. The controller shall be push button type and provide position indication through a full color backlit LCD display. It shall have manual adjustment of the brightness as well as an auto-dimming option.

In addition to the open and close buttons, the controller shall have three additional buttons that shall be available to be used for preset selection, preset activation, and menu navigation. The controller shall include a digital pressure gauge on the LCD display. If equipped with CAFS, the unit must also be capable of turning on and off the electric CAFS solenoid. A color-coded name plate shall be installed over the valve control.

One controller shall be located on the pump operators panel and one shall be located up in the dunnage near the monitor.

The monitor controller shall have a treadpalte cover installed to protect it.

MONITOR

One (1) Elkhart Stinger 2.0 Model 8297-25 monitor with ground base and top mount adapter shall be provided. The lightweight Elk-O-Lite monitor shall have a 3" waterway for flows up to 1250 GPM. The monitor shall be painted red urethane enamel.

The monitor shall have a handwheel driven vertical worm gear that shall be fully enclosed and protected from the elements. The monitor shall be capable of vertical travel from 75 degrees above to 15 degrees below horizontal in the deck mount mode. The monitor shall be capable of 360 degree travel while in the deck mode with a positive lever lock for positioning.

This monitor shall be capable of being removed from the Elkhart Model 8298F with 3" 150# ANSI top mounting flange adapter and used as a portable monitor. The monitor shall be equipped with a carrying handle that shall also act as a quick release mechanism. The unit shall have greased fittings for easy lubrication.

This monitor shall be equipped with a 200 PSI liquid filled pressure gauge with 3" 150# ANSI mounting flange.

The Elkhart Stinger 2.0 ground base with two (2) 2-1/2" NH female clappered inlets (P/N 80790101) shall be included.

MASTER STREAM NOZZLE

One (1) Elkhart Select-O-Matic Model #SM-1250, part number 03779201, nozzle shall be provided. This "X-treme" nozzle automatically adjusts with a stainless steel spring mechanism to accommodate the fluctuating flows of 300 to 1250 GPM while operating at a lower pressure of 75 PSI.

The stream pattern can easily be adjusted with the large control handles for an infinite pattern selection from straight stream to a wide full fog. The construction of the nozzle shall be lightweight, Elk-O-Lite with a 2-1/2" NST swivel base and highly visible, yellow protective urethane bumper.

MASTER STREAM STACKED TIPS

One (1) Elkhart Model #ST-194, quad stacked handline tips and Elkhart Model #282-A stream shaper shall be provided. The set shall consist of four (4) tips with the base tip having a 2-1/2" female NH swivel inlet and 2" outlet. The other tip sizes shall be 1-3/4", 1-1/2" and 1-3/8". Each tip shall be laser engraved with orifice size and thread size.

TELESCOPING MONITOR PIPE

One (1) Task Force Tips model # XG12VL-PL manually telescoping waterway shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and transportation and shall be capable of being raised to an extended height of 12" by lifting a quick release latch located at the base of the extension tube. This latching device shall be capable of locking the waterway in either the raised or lowered position while maintaining the ability to horizontally rotate the monitor device 360 degrees.

A sensor shall be located on the waterway that signals a 12 volt indicator light installed in the cab to illuminate to indicate that the monitor is raised.

The aluminum riser shall have a 3" waterway; hardcoat anodized finish and be furnished with a 3" Victaulic inlet and a 3" male NPT outlet.

ELECTRIC REWIND HOSE REEL

One (1) Hannay unpainted aluminum hose reel with leak proof ball bearing swing joint, adjustable friction brake, electric rewind shall be installed. The reel shall be plumbed with wire reinforced; high-pressure hose coupled. The reel shall be bolted to a mounting system for easy service or removal.

The hose reel is to be mounted in the area above the pump.

>>Left side of dunnage

A push button hose reel rewind switch shall be installed to control the electric rewind hose reel. The exact location shall be determined at construction.

>>Switch location will be located at final inspection.

One (1) 1" discharge shall be provided and piped from the fire pump to the hose reel with flexible high pressure hose. The quarter turn ball valve shall be controlled on pump panel. A color-coded nameplate label shall be provided near the valve control handle.

An Innovative Controls ¾" cast bronze quarter-turn drain/bleeder valve shall be installed. The valve shall be complete with a chrome plated bronze ball, reinforced teflon seals, and blow-out proof stem rated to 600 PSI. A chrome plated zinc handle shall be provided on each drain valve complete with a recessed ID label provision. The handle shall lift, to open and push down, to close.

The specified hose reel shall be piped to the normal pressure side of the fire pump.

One (1) Akron 8000 Series one-inch (1") valve with a stainless ball shall be supplied.

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. The gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with

recessed color-coded label.

One (1) 2-1/2" IC discharge pressure gauges (0-400 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

Three (3) 50' foot lengths of 1" water hose (150') with pin lug couplings and 800 PSI working pressure shall be provided and mounted on the specified hose reel.

One (1) stainless steel roller assembly shall be provided on the left side hose reel.

One (1) stainless steel roller assembly shall be provided on the right side hose reel.

FOAM SYSTEM & TANKS

FOAM PRO FOAM SYSTEM

One (1) FoamPro part number S105-2001 electronic foam proportioning system shall be provided. The system shall be capable of using both Class A and most Class B foam concentrates. The foam proportioning operation shall be designed for direct measurement of water flows, and shall remain consistent within the specified flows and pressures. The system shall be capable of accurately delivering foam solution as required by applicable sections of the NFPA standards.

The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. There shall be a microprocessor incorporated within the electronic controls that shall receive input from the system's flowmeter, while also monitoring the foam concentrate pump output. The microprocessor shall compare the values to ensure that the desired amount of foam concentrate is injected onto the discharge side of the fire pump.

Paddlewheel-type flowmeter(s) shall be installed in the discharges specified to be "foam capable". When the use of more than one (1) flowmeter is required, an electronic interface module will be provided to total these flows and send the flow total to the microprocessor in the computer control module.

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 10%, in 0.1% increments
- Show current flow-per-minute of water
- Show total volume of water discharged during and after foam operations are completed

- Show total amount of foam concentrate consumed
- Simulate flow rates for manual operation
- Perform setup and diagnostic functions for the computer control microprocessor
- Flash a "low concentrate" warning when the foam concentrate tank (s) become low
- Flash a "no concentrate" warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) become empty

A 12 volt electric motor driven positive displacement foam concentrate pump shall be provided and installed in an accessible location. The pump capacity range shall be 0.1 to 2.6 GPM (9.5L/min) at 150 PSI with a maximum operating pressure up to 400 PSI (27.6 BAR). The system shall draw a maximum of 40 amps at 12 volts. An electronic driver for the pump motor shall be mounted to the base of the pump and shall receive signals from the computer control display, and regulate the 1/2 horsepower (.40 Kw) electric motor directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate, preset by the pump operator is injected into the water stream.

A full flow check valve shall be provided to prevent foam contamination of the fire pump and water tank or water contamination of the foam tank.

Components of the complete proportioning system as described above shall include:

- Operator control and display
- Paddlewheel flowmeter(s)
- Pump and electric motor/motor driver
- Wiring harnesses
- Low level tank switch
- Foam injection check valve
- Main waterway check valve

The foam system shall be installed and calibrated to manufacturer's requirements. In addition the system shall be tested and certified by the apparatus manufacturer to meet applicable NFPA standards.

The foam system design shall be tested and pass environmental testing in accordance to SAE standards. The system shall be third party tested to certify compliance with RFI/EMI emissions per MIL-STD-416E.

An installation and operation manual shall be provided for the unit. The system shall have a one (1) year limited warranty by the foam system manufacturer.

CONTROL CONNECTION CABLE FOAM SYSTEM

The FoamPro 2001 Series foam system shall be provided with a twelve (12) foot control cable from the controller to the foam pump assembly.

PUMP PANEL CONTROL FOAM SYSTEM

The FoamPro 2001 Series foam system shall be provided with pump panel mounted control assembly.

INSTRUCTION AND RATING LABEL -- FOAM SYSTEM

A FoamPro part number 6032-0020 instruction and system rating label shall be provided. The label shall display information for a FoamPro 2001 Series foam system and shall meet applicable sections of the NFPA standards.

SCHEMATIC LABEL -- FOAM SYSTEM

A FoamPro foam system schematic label shall be installed on the pump panel near foam controls. The label shall be a diagram of the FoamPro 2001 foam system layout and shall meet applicable sections of the NFPA standards.

1" FOAM TANK CONTROL -- CLASS A

One (1) Class A foam tank shall be plumbed with 1" valve and corrosion resistant hose from the foam tank to the foam inlet of the foam system. The manually opened valve shall be provided behind the pump panel with a label.

INTEGRAL CLASS A FOAM TANK -- 30 GALLON

One (1) thirty (30) gallon Class A foam tank shall be installed within the water tank. The non-corrosive foam tank shall meet applicable sections of NFPA standards. The foam concentrate tank shall be provided with sufficient wash partitions so that the maximum dimension perpendicular to the plane of any partition shall not exceed 36 inches. The swash partition(s) shall extend from wall to wall and cover at least 75 percent of the area of the plane of the partition.

The foam concentrate tank shall be provided with a fill tower or expansion compartment having a minimum area of 12 square inches and having a volume of not less than 2 percent of the total tank volume. The fill tower opening shall be protected by a completely sealed air-tight cover. The cover shall be attached to the fill tower by mechanical means. The fill opening shall be designed to incorporate a 1/4 inch removable screen and shall be located so that foam concentrate from a five (5) gallon container can be dumped directly to the bottom of the tank to minimize aeration without the use of funnels or other special devices.

The foam tank fill tower shall be equipped with a pressure/vacuum vent that enables the tank to compensate for changes in pressure or vacuum when filling or withdrawing foam concentrate

from the tank. The pressure/vacuum vent shall not allow atmospheric air to enter the foam tank except during operation or to compensate for thermal fluctuations. The vent shall be protected to prevent foam concentrate from escaping or directly contacting the vent at any time. The vent shall be of sufficient size to prevent tank damage during filling or foam withdrawal.

A color coded label or visible permanent marking that reads "FOAM TANK FILL" shall be placed at or near any foam concentrate tank fills opening. A label shall be placed at or near any foam concentrate tank fill opening that specifies the type of foam concentrate the system is designed to use. Any restrictions on the types of foam concentrate that can be used with the system shall also be stated, and a warning message that reads "WARNING: DO NOT MIX BRANDS AND TYPES OF FOAM."

The foam concentrate tank outlet connection shall be designed and located to prevent aeration of the foam concentrate and shall allow withdrawal of 80 percent of the foam concentrate tank storage capacity under all operating conditions with the vehicle level.

FOAM TANK DRAIN -- UNDER TANK

The foam tank shall have one (1) 1" gate valve drain provision installed.

FOAM TANK RE-FILL SYSTEM

One (1) Hale EZ-Fill foam concentrate refill system shall be installed on the apparatus. The system shall permit refilling of the on-board foam tank from an outside foam container or cell. The system does not require the operator to climb to the top of the apparatus with foam buckets to access the foam tank fill tower.

The system shall include an integral 12 volt electric pump, pump control panel, positive displacement foam pump, piping from the panel to the foam tank and a means to flush the system after use.

An on-off switch with label shall be provided on the control panel. The inlet connection on the side of the apparatus shall permit use of an intake suction hose and shall be covered with a dust cap.

FOAM SYSTEM DESIGN AND PERFORMANCE REQUIREMENTS

The proportioning system shall be capable of proportioning foam concentrate in accordance with the foam concentrate manufacturer's recommendations for the type of foam concentrate used in the system over the system's design range of flow and pressures. The foam proportioning system water flow characteristics and the range of proportioning ratio shall be specified as noted herein.

The latest foam system shall be in compliance with applicable NFPA standards as it relates to this specified system

Plumbing and Strainer

The foam concentrate supply line shall be non-collapsible. A means shall be provided to prevent water back flow into the foam proportioning system and the foam concentrate storage tank.

A strainer or filter shall be provided on the foam concentrate supply side of the foam proportioner to prevent any debris that might affect the operation of the foam proportioning system from entering the system. The strainer assembly shall consist of a removable straining element, housing, and retainer. The strainer assembly shall allow full flow capacity of the foam supply line.

Foam System Controls

The foam proportioning system operating controls shall be located at or near the pump operator's position and shall be clearly identified. Foam proportioning system shall be provided with accessible controls to completely flush the system with water according to the manufacturer's instructions.

Labels and Instructions

An instruction plate shall be provided for the foam proportioning system that include, at a minimum, piping schematic of the system and basic operating instructions. Labels that are marked clearly with the identification and function shall be provided for each control, gauge, and indicator related to the foam proportioning system.

A label shall be provided on the pump operator's panel that identifies the type of foam concentrate that the foam proportioning system is designed to use. It shall also state the minimum/maximum foam proportioning rate at the minimum/maximum foam proportioning rated system flow and pressure.

Two (2) copies of an operations and maintenance manual shall be provided. They shall include a complete diagram of the system together with operating instructions and details outlining all recommended maintenance procedures.

Foam System Testing

The accuracy of the foam proportioning system shall be certified by the foam equipment manufacturer and also tested by the installer prior to delivery of the apparatus in compliance to NFPA standards.

PUMP PANEL --SIDE MOUNT

SIDE MOUNT PUMP ENCLOSURE

The side mount pump enclosure shall be removable and supported from the chassis frame rails. This enclosure will allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

All pump suction and discharge controls are to be mounted on the driver side pump operator's panel so as to permit operation of the pump from a central location. The fire pump, valves and controls shall be accessible for service and maintenance as required by applicable sections of NFPA standards.

The "master" gauges shall be suitably enclosed and mounted on a full pump compartment width "hinged" gauge panel constructed of the same material as the pump operators control panel, allowing access to the backside of all gauges and gauge lines. The individual gauges shall be mounted inline with the control handle or adjacent to the control handle. Panel is to include a stainless steel piano hinge, flush mounted chrome plated trigger latch, and stainless steel cable end stops. Electrical wiring and all gauge lines shall be properly tie wrapped to prevent kinking or cutting of the lines when the panel is opened.

The following controls and equipment as specified in the specifications, shall be provided on the pump panel or within the pump enclosure:

- Primer.
- Pump and plumbing area service lights.
- Pressure control device and throttle control.
- Fire pump and engine instruments.
- Pump intakes and discharge controls.
- Master intake and discharge gauges.
- Tank fill control.
- Tank suction control.
- Water tank level gauge.
- Pump panel lights.

Crosslay Installation

The area atop the pump enclosure shall be notched for the installation of a crosslay hose bed. The hosebed shall have smooth sides and a perforated floor to allow for drainage. Provisions shall be provided to secure hose and equipment per requirements of applicable NFPA standards.

ENCLOSED DUNNAGE COMPARTMENT OVER PUMP ENCLOSURE

One (1) enclosed dunnage compartment, with a bolt on lid, shall be located on the top of the pump module. The compartment will be constructed as large as space permits with removable slip resistant lid and a removable floor in the base of the compartment.

Hinged door constructed of material same as the right side pump panel shall be installed in the upper right side of the compartment and shall be provided with a positive latching system for easy opening.

LEFT SIDE RUNNING BOARD -- SIDE MOUNT PANEL

The left side mount pump panel shall be equipped with side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance with applicable sections of NFPA requirements.

RIGHT SIDE RUNNING BOARD -- SIDE MOUNT PANEL

The right side mount pump panel shall be equipped with side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance with applicable sections of NFPA requirements.

FLOATING HOSEWELL COMPARTMENT -- RIGHT SIDE

One (1) floating hosewell shall be recessed in the right side running board of the apparatus pump panel. The hosewell shall be constructed of aluminum material and shall be provided with drain holes drilled in each bottom corner with plastic grating on the floor.

The hose and couplings shall be secured in compliance to applicable NFPA standards.

Capacity for the following purchaser supplied hose:

HOSE WELL SECUREMENT

There shall be two (2) Velcro straps provided for the securement of the hose in the running board hose well.

PUMP ENCLOSURE ACCESS DOOR -- RIGHT SIDE UPPER

A pump panel access door shall be provided on the upper right side of the side mount pump enclosure. The access door shall be approximately 18" high and as wide as possible. The door shall be constructed aluminum coated with black Line-X with push button type latches.

FRONT ACCESS PUMP PANEL

A removable front access panel shall be installed on the front of the pump enclosure of the apparatus. The panel shall be constructed of aluminum tread plate and be fastened to the pump enclosure with push button or D-ring type latches.

PUMP PANEL -- SIDE MOUNT

The pump operator's panel, along with the lower left hand and right hand pump panels shall be constructed of Line-X aluminum material and be fastened to the pump enclosure with 1/4" stainless steel bolts.

The instrument area shall have a stainless steel continuous hinge that shall swing for easy access to gauges.

LEFT SIDE PUMP PANEL -- BOLTED

The pump panel installed on the left hand side of the pump enclosure shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

RIGHT SIDE PUMP PANEL -- BOLTED

The pump panel installed on the right hand side of the pump enclosure shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

PUMP PANEL STAINLESS STEEL TRIM PANELS

Stainless steel intake and discharge trim rings shall be installed to the apparatus with mounting bolts. These assemblies will be used to identify intake and discharge ports with color and verbiage, using separate identification tags protected by chrome plated bezels. These trim rings are designed and manufactured to withstand the environment and shall be backed by a warranty equal to that of the exterior paint and finish. All labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

LABELS

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

COLOR CODED PUMP PANEL LABELING AND NAMEPLATES

Discharge and intake valve controls shall be color coded in compliance to guidelines of applicable sections of NFPA standards.

Innovative Controls permanent type nameplates and instruction panels shall be installed on the pump panel for safe operation of the pumping equipment and controls.

MIDSHIP PUMP PANEL LIGHTS -- LEFT SIDE

Three (3) Techiq E10-W0001-1 or equal LED lights with clear lenses shall be installed under an instrument panel light hood on the left side pump panel. The lights shall be controlled by a switch located on the operator's instrument panel.

MIDSHIP PUMP PANEL LIGHTS -- RIGHT SIDE

Two (2) Tecniq E10-W0001-1 or equal LED lights with clear lenses shall be installed under an instrument panel light hood on the right side pump panel. The lights shall be controlled by a switch located on the operator's instrument panel.

PUMP ENGAGED LIGHT

One (1) pump panel light shall be illuminated at the time the fire pump is engaged into operation. The remaining lights shall be controlled by a switch located on the operator's instrument panel.

MASTER DISCHARGE AND INTAKE GAUGES

Two (2) 4" diameter IC discharge pressure and intake gauges (30"-0-600 PSI) shall be provided. The face of the gauge shall be a WHITE dial with black letters. The gauges will be located on the pump instrument panel.

The master gauges shall have clear scratch resistant molded crystals with captive O-ring seals shall be used to ensure distortion free viewing and to seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F. Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the

tube life and gauge accuracy. A polished chrome-plated brass bezel shall be provided to prevent corrosion and protect the lens and gauge case.

TEST TAPS

Test taps for pump intake and pump pressure shall be provided on the pump instrument panel and be properly labeled.

WATER/FOAM TANK LEVEL GAUGE - PUMP PANEL

The apparatus shall be equipped with an Innovative Controls SL Series Tank Level Monitor System shall be installed. The display model # shall be 3030359-04. The system shall include an electronic dual water/foam display module, two (2) pressure transducer-based sender units, and two (2) 15' connection cables. The display module shall show the volume of water/foam in the tanks using 10 super bright easy-to-see LEDs arrangement. The 10-LED arrangement shall form a straight vertical pattern to easily distinguish the tank level at a glance. Tank level indication is enhanced by the use of green LEDs at the full and near-full levels, amber LEDs between ¾ and ¼ tank levels, and red LEDs at the near-empty and empty levels. The electronic dual water/foam display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted dual water/foam display module shall be mounted to a chrome plated panel-mount bezel with a durable easy-to-read polycarbonate insert featuring blue graphics and a water icon for water and red graphics and a foam icon for foam.

All programming functions shall be accessed and performed from the front of the display module. The programming includes self-diagnostics, manual or self-calibration, and networking capabilities to connect remote slave displays. Low tank level warnings shall include flashing red LEDs starting below the ¼ level and an output for an audible alarm.

The display module shall receive an input signal from a pressure transducer. This stainless steel sender unit shall be installed on the outside of the water tank near the bottom. All wiring, cables and connectors shall be waterproof without the need for sealing grease.

Location of the water/foam tank level display shall be at the pump panel.

WATER LEVEL DISPLAY

The apparatus shall be equipped with one (1) Innovative Controls 5-LED Mini Slave Water Level display. The display and shall be installed in the chassis cab. Five colored LEDs shall be provided on the indicator module in a vertical line to easily distinguish the water tank level at a glance.

WATER TANK LEVEL LIGHTS

Three (3) Whelen PS-TANK2 vertically mounted LED lights shall be installed one each side of the apparatus and one (1) on the rear to allow for monitoring the water tank level from a distance.

They shall be configured as follows:

- GREEN - Position 1 indicates FULL
- BLUE - Position 2 indicates 3/4
- AMBER - Position 3 indicates 1/2
- RED - Position 4 indicates 1/4

Each light shall remain illuminated until the water level drops below full 3/4, 1/2, or 1/4 levels. When the level drops below 1/4 the RED light will flash to indicate an empty tank. The Whelen PS-TANK water tank level lights shall be controlled with an Innovative Controls remote driver.

WATER TANKS

WATER TANK - 500 GALLON

The apparatus shall be equipped with a five-hundred (500) gallon polypropylene water tank. The tank shall be equipped with a four-inch (4") overflow pipe.

WATER TANK

The apparatus shall be equipped with a rectangular tank.

WATER TANK FILL TOWER

A fill tower measuring approximately 10” x 10” square shall be provided on the water tank up to and including 500 gallons total capacity.

>>Overflow shall be routed down and past the fuel tank.

The apparatus shall be equipped with a polypropylene water tank. The tank body and end bulkheads shall be constructed of .75" thick, polypropylene, nitrogen-welded and tested inside and out. Tank construction shall conform to applicable NFPA standards. The tank shall carry a lifetime warranty.

The transverse and longitudinal .375" thick swash partitions shall be interlocked and welded to each other as well as to the walls of the tank. The partitions shall be designed and equipped with vent holes to permit air and liquid movement between compartments.

The .5" thick cover shall be recessed .375" from the top of the side walls. Hold down dowels shall extend through and be welded to both the covers and the transverse partitions, providing rigidity during fast fill operations. Drilled and tapped holes for lifting eyes shall be provided in the top area of the booster tank.

A combination vent/water fill tower shall be provided at front of the tank. The 0.5" thick polypropylene fill and overflow tower shall be equipped with a hinged lid and a removable polypropylene screen. The overflow tube shall be installed in fill tower and piped with a minimum schedule 40 PVC pipe through the tank.

The water tank sump shall be located in the forward area of the tank. There will be a schedule 40 polypropylene tank suction pipe from the front of the tank to the tank sump. The tank drain and clean out shall be located in the bottom of the tank sump. The sump shall have a minimum 3" threaded outlet on the bottom to be used for a combination clean out and drain.

The pump to tank refill connection shall be a sized to mate with tank fill discharge line. A deflector shield inside the tank will also be provided.

The tank shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area.

The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4” x 1” and a hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.

A picture frame type cradle mount with a minimum of 2" x 2" x 1/4” mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4” by 6” high are permitted for the purpose of capturing the tank.

Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4” and shall be approximately 6” to 12” long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4” inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be

bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank.

Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the tank for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

The water tank shall be certified for the capacity of the water tank prior to delivery of the apparatus. This capacity shall be recorded on the manufacturer's record of construction and the certification shall be provided to the purchaser when the apparatus is delivered.

WATER TANK DRAIN VALVE

One (1) 1-1/2" diameter gated quarter-turn drain valve shall be provided for the water tank.

HOSEBED

HOSEBED SINGLE AXLE

The hose bed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum slats. The slats shall have an anodized, radiused ribbed top surface. The slats shall be of widths approximately 3/4" high x 6" wide and shall be welded into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose.

The apparatus hose body shall be properly reinforced without the use of angles or structural shapes and free from all projections that might injure the fire hose.

The main apparatus hose body shall run the full length of the apparatus body from behind the pump panel area to the rear face of the body.

The upper rear interior of the hose body on the right and left sides shall be overlaid with brushed stainless steel to protect the painted surface from damage by hose couplings.

HOSE BED STORAGE CAPACITY

The hose bed shall be designed to have a storage capacity for a minimum of 55 cubic feet of fire department supplied fire hose.

ALUMINUM HOSEBED DIVIDER

One (1) adjustable hosebed divider constructed of .250" aluminum shall be installed on the apparatus.

ALUMINUM HOSEBED COVER

The hosebed shall be equipped with a reinforced hinged .125" aluminum diamond plate cover. The covers shall be of the sloped design for proper water runoff. Positive hold-open devices shall be provided to hold the door in the open position.

The cover, approximately 37” to 48” wide, shall be installed the full length of the hose bed.

The hosebed cover shall be labeled, "Not a Standing or Walking Surface", per NFPA.

MAIN HOSEBED DIVIDER

One (1) stationary hosebed divider shall be provided in the main hosebed.

The hosebed divider shall be fabricated of 1/4" smooth aluminum sheet stock, pressed into a "T" shaped aluminum extrusion for added strength along the bottom and front edges of the divider.

Divider shall be bolted in place, front and rear, to allow for ease of removal or relocation.

MANUALLY OPERATED ALUMINUM HOSEBED COVER

The polished aluminum treadplate hosebed covers extending the full-length and width of the main hosebed shall have lift up handles installed on each hose cover to manually open the hosebed covers.

HOSEBED LIGHTS

One (1) AMDOR H20 LED light (approximately 40" in length) shall be installed on the underside of the aluminum hosebed covers to provide illumination for repacking of fire hose. The 12 volt lights shall be automatically controlled by a switch which activates upon opening of the door. The lights shall also be connected to the hazard light in the chassis cab to indicate when the hose bed covers are in the open position.

The compartment light will be controlled by a magnetic "On-Off" switch located on each compartment door.

REAR VINYL FLAPS FOR ALUMINUM COVER

There shall be a vinyl flaps attached to each aluminum hosebed cover. The vinyl flaps shall

cover the area on the rear of the hosebed from top to bottom. The flaps shall be independent of each other but attachable with velcro in the center. The bottom edge of the flap shall be shall be secured utilizing a hook and loop fastening system.

The vinyl cover shall be red in color.
BODY CONSTRUCTION

MODULAR BODY

1/8" ALUMINUM BODY

The body shall be fabricated of aluminum extrusions, smooth aluminum sheet and aluminum treadplate.

The aluminum extrusion alloy shall be 6061 with a temper rating of T6, and have a tensile strength of 45,000 PSI and yield strength of 40,000 pounds. The aluminum extrusions shall 3" x 3" aluminum tubing, 1-3/4" x 3" aluminum tubing and 3" x 3" aluminum angle and specially designed extrusions, up to .250" wall thickness where applicable.

The smooth aluminum sheet material alloy shall be 5052 with a temper rating of H32, and have a tensile strength of 33,000 PSI and yield strength of 28,000 pounds.

The aluminum treadplate alloy shall be 3003 with a temper rating of H22, and have a tensile strength of 30,000 PSI and yield strength of 28,000 pounds.

The extrusions shall be designed as structural-framing members with the smooth aluminum and treadplate fabricated to form compartments, hosebeds, and floors. All aluminum material shall be welded together using the latest mig spray pulse arc welding system.

Compartment floors shall be of the sweep out design with the floor higher than the compartment door lip and to be water and dust proof. All compartments shall be made to the maximum practical dimensions to provide maximum storage capacity. To ensure maximum storage space, the apparatus shall be constructed without any void spaces between the body and the compartment walls. Double wall construction does not meet this requirement.

All exterior compartments shall have polished aluminum drip moldings installed above the doors where necessary to prevent water from entering the compartments.

Wheel well panels shall be formed aluminum that is welded in place. There shall be no visible bolt heads, retention nuts or fasteners on the exterior surface of the panel. To fully protect the wheel well area from road debris and to aid in cleaning, a full depth radius wheel well liner shall be provided. The frame side of the wheel well area on each side of the opening shall be attached

to the frame side of the front and rear compartments. All seams on the frame side of the body shall be welded and caulked to prevent moisture from entering the compartments.

The rear wheel wells shall be radius cut for a streamlined appearance. A fenderette shall be furnished at each rear wheel well opening, held in place with stainless steel fasteners.

FASTENERS

All aluminum and stainless steel components shall be attached using stainless steel fasteners.

Compartment door hinges, handrails and running boards shall be attached using minimum 1/4" diameter machine bolt fasteners.

3/16" diameter fasteners shall only be used in nonstructural areas such as; door handles, trim moldings, gauge mounting, etc.

COMPARTMENT FLOORS

The compartment floors shall be constructed of aluminum treadplate material.

GALVANIZED SUB-FRAME

The apparatus body subframe shall be constructed entirely of heavy steel structural channel material.

Two full frame lengths, three-inch (3") 3.4 pound per foot longitudinal steel channels shall form the sides of the body subframe and sides of the water tank cradle. Subframe crossmembers shall be fabricated with three inch (3") 3.4 pound per foot heavy steel channel cross members welded to the longitudinal body subframe sides and the full length frame pads.

Two full frame length 1/2" x 3" flat steel frame pads shall be attached to the body subframe and rest on top of the chassis frame rails for proper frame weight distribution.

The steel frame pads, longitudinal steel channels and subframe crossmembers shall be attached to the chassis frame rails using heavy "U" bolt fasteners to allow removal of the subframe and body assembly from the chassis. There shall be a barrier provided between the subframe and body to prevent electrolysis.

The rear subframe and lower body platform support members shall be of the "two piece" design, fabricated of 3.4 lb. Per foot heavy channel and welded to the full length subframe channel liners at the rear.

A minimum of two rear platform support channels shall be provided and constructed of 3.4 lb. Per foot heavy steel material. Each support channel shall have welded in gusset where the support meets the rear subframe rails.

After fabrication the entire subframe assembly shall be hot dip galvanized to prevent corrosion. The hot dip galvanized subframe shall have a lifetime warranty against failure due to corrosion.

This steel subframe shall carry the weight of the apparatus body, tank, water and equipment. This method of apparatus construction gives an excellent strength/weight ratio.

BODY CONFIGURATION

The aluminum apparatus body shall be up to 144" long, reference the drawing for actual body length.

SINGLE AXLE WHEEL AREA

For ease of accessibility and maintenance, wheel well panels shall be double break formed painted smooth plate that is welded in place.

To fully protect the wheel well area from road debris and to aid in cleaning, a full depth (minimum of 25") radius wheel well liner shall be provided. Wheel well liner shall be smooth aluminum to prevent corrosion.

FENDERETTES

The rear wheel wells shall be radius cut for a streamlined appearance. A polished aluminum fenderette shall be furnished at each rear wheel well opening, held in place with concealed stainless steel fasteners.

BODY WIDTH

The overall width of the pumper body shall not exceed 102".

COMPARTMENT DEPTH

The side compartments on the pumper body shall have the maximum available height and depth dimensions. These dimensions shall remain consistent for the full height and depth of the compartment.

HOSEBED WIDTH

The width of the pumper body hosebed shall be 48".

COMPARTMENT HEIGHT

The left side body compartments shall be 72".

COMPARTMENT HEIGHT

The right side body compartments shall be 72" high.

ROLL UP DOOR CONSTRUCTION

The roll up door(s) shall be fabricated from aluminum extrusions and be manufactured and assembled in the United States.

The door slats shall be double-wall extrusions with dimensions of 1.366" high x .315" thick. The exterior surface shall be flat and the interior surface concave to deflect loose equipment to prevent the door from jamming. Each slat shall have interlocking end shoes to prevent the slat from moving side to side resulting in binding of the door. Each slat shall be separated by a co-extruded PVC and rubber inner seal to prevent metal to metal contact and minimize dirt and moisture from entering the compartment. The inner seal shall not be visible from the exterior to maintain a clean appearance of door. The slats shall have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects.

The track shall be a one (1) piece aluminum assembly that has an attaching flange and finishing flange incorporated into the design that facilitates installation and provides a finished look to the door without additional trim or caulking. A low profile side seal shall be utilized to maximize usable compartment space.

A drip rail designed to prevent water from dripping into the compartment shall be provided. The drip rail shall have a built in replaceable non-contacting seal to eliminate scratching of the surface of the door.

Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door and have “V” shaped double seal to prevent water and debris from entering the compartment. The door latch system shall be a full width one (1) piece lift bar that enables the user to operate with one hand.

The roll mechanism shall have a clip system that connects the curtain slats to the operator drum to allow for easy tension adjustment without tools. A four (4) inch diameter counterbalanced operator drum to shall be incorporated to assist in lifting the door.

EZ-PULL DOWN STRAPS

Seven (7) elastic nylon straps shall be provided and installed on each roll up door . The straps shall be secured to the side wall of the interior compartment in a way that will allow the EZ-Pull

strap to contract automatically and tuck inside the compartment when closed to prevent the strap from dangling and hindering closing of the door. When the door is the open position, the straps shall be installed so that they are fully extended as to not interfere with removing items from the compartment. For the ease of locating, the straps shall be bright orange in color.

DOOR DRIP PANS

An aluminum drip pan shall be provided on the roll up door.

DOOR LOCKS

A cylindrical door lock shall be provided on the roll up door(s). The door lock shall operate a rod mechanism located within the bottom rail of the door that extends into both side rails when locked.

LEFT FRONT COMPARTMENT

There shall be one (1) full height compartment located ahead of the rear wheels. The compartment shall be equipped with a full height single painted roll up door.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

Two (2) adjustable shelf shall be constructed of .125” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

The floor area of the compartment shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 9/16" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is

corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

LEFT OVERWHEEL COMPARTMENT

There shall be one (1) compartment above the rear wheels. The compartment shall be equipped with a single painted roll up door.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

SWING-OUT PAC TRAC TOOL BOARD

One (1) swing-out vertical tool board assembly constructed of PacTrac "Dual Trac" shall be provided with a device for holding it in the "in" and "out" positions.

The tool board shall have a grab handle, for easy access with a gloved hand.

The floor area of the compartment shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 9/16" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

TOOL MOUNTING BOARD

One (1) piece, 120" long, of Performance Advantage PAC Trac model #7000, patented tool mounting system shall permit quick and secure installation, relocation or removal of the brackets

without drilling any holes shall be provided. The material shall be a 6063-T5 aluminum extrusion with a mill finish. This material shall have the ability to be cut to a desired length and offer the flexibility for a wide variety of installations.

>>Rear Compartment wall, full width and height

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

LEFT REAR COMPARTMENT

There shall be one (1) full height compartment located behind the rear wheels. The compartment shall be equipped with a full height single painted roll up door.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

One (1) adjustable shelf shall be constructed of .125” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

250# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in a standard depth compartment. The tray with telescoping slides and roller bearings shall be rated to a maximum load of 250 lbs. Tray shall be of a closed-in design, formed of .125" smooth aluminum plate, fabricated with two (2) inch sides.

The tray unit shall roll out to full extension of the compartment, with latching mechanism to hold tray in both fully-extended and stored positions.

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT FRONT COMPARTMENT

There shall be one (1) full height compartment located ahead of the rear wheels. The compartment shall be equipped with a full height single painted roll up door.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

Three (3) adjustable shelf shall be constructed of .125” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam

locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

>>Two (2) 1/2 depth, One (1) full depth

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

The floor area of the compartment shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 9/16" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT HIGH SIDE COMPARTMENTS

There shall be one (1) compartment above the rear wheels. The compartment shall be equipped with a single painted roll up door.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

One (1) adjustable shelf shall be constructed of .125” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and

bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

The floor area of the compartment shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 9/16" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

RIGHT REAR COMPARTMENT

There shall be one (1) full height compartment located behind the rear wheels. The compartment shall be equipped with a full height single painted roll up door.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

Two (2) adjustable shelf shall be constructed of .125” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam

locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

>>Two (2) 1/2 depth portion

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

250# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in a standard depth compartment. The tray with telescoping slides and roller bearings shall be rated to a maximum load of 250 lbs. Tray shall be of a closed-in design, formed of .125" smooth aluminum plate, fabricated with two (2) inch sides.

The tray unit shall roll out to full extension of the compartment, with latching mechanism to hold tray in both fully-extended and stored positions.

>>Above SCBA bottle rack

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

SCBA CYLINDER STORAGE

One (1) formed aluminum storage unit with individual compartments shall be provided to store six (6) fire department-supplied air cylinders. Unit to be horizontally or vertically installed and coated with (black) thermoplastic material for durability and to provide scuff protection to the air cylinders. A black nylon containment net shall be installed to secure the bottles in the bottle rack. The net shall be securely fastened on one end, with the other end being equipped with snaps, for access to the bottles.

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

REAR BODY CONFIGURATION

The rear of the apparatus body shall be of the flat back design.

REAR CENTER COMPARTMENT

There shall be one (1) full height compartment located at the rear of the apparatus. The compartment shall be equipped with a full height **painted** finish roll up door. The compartment shall be partitioned off from the side compartments.

The compartment shall be equipped with the following:

One (1) louver with filter shall be installed in the compartment.

ADJUSTABLE SHELVING TRACKS

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

ADJUSTABLE SHELF

One (1) adjustable shelf shall be constructed of .125” smooth aluminum plate with 1.5” formed vertical lip front & back. Shelf supports on each side to be constructed of .188” aluminum and bolted to an aluminum extrusion (mounted vertically) by use of 3/8” bolts and spring-loaded cam locks. If shelf is longer than 40” a reinforcement by aluminum gusset is to be placed full-length on bottom of shelf.

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

250# ROLLOUT TRAY

One (1) roll-out equipment tray shall be installed in a standard depth compartment. The tray with telescoping slides and roller bearings shall be rated to a maximum load of 250 lbs. Tray shall be of a closed-in design, formed of .125" smooth aluminum plate, fabricated with two (2) inch sides.

The tray unit shall roll out to full extension of the compartment, with latching mechanism to hold tray in both fully-extended and stored positions.

The shelf/tray shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 1/2" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LUMA BAR vertically mounted roll-up compartment LED door lights shall be installed one each side of the door opening. The compartment lights shall be integrated into the roll-up door tracks with the light actuation with the door opening.

The lights shall have a polycarbonate lens to eliminate breakage from impact and eliminate heat build up.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

REAR STEP - 16” BOLT-ON

A 16" deep step surface shall be provided at the rear of the apparatus body, bolted in place and easily removable for replacement or repair. The tailboard shall be constructed of .188" aluminum diamond plate or equal non-slip surface in compliance with NFPA #1901 standards.

A label shall be provided warning personnel that riding on the rear step while the apparatus is in motion is prohibited.

SLIDE OUT VERTICAL LADDER MOUNTINGS

The ladder shall slide into the right rear of the apparatus, through the right side of the body. The vertically mounted slide in assembly shall be an integral part of the body and accessible through a hinged door.

The ladders tunnel area than extends in to the pump house shall have a bolted in housing around ladders to prevent road debris and material from contacting the ladders.

The hinged door shall be constructed of smooth material, with chevron striping applied to match the rear of the apparatus body.

INTERNAL FOLDING ATTIC LADDER MOUNTING

An internal mounting shall be provided for the specified folding attic ladder.

LADDER SOURCE

New ground ladders shall be provided by the body builder.

PIKE POLE MOUNTING BRACKET

Three (3) tube shall be provided for pike pole mounting. The tube shall have a 2" interior

diameter and shall be mounted in the ladder tunnel.

PIKE POLE SOURCE

The pike poles shall be provided by the body builder.

HARD SUCTION MOUNTING

One (1) hard suction hose compartment shall be provided at the top of the body compartments, behind the roll up door, on the left side. The design shall allow the hose to be individually removed from the rear of the apparatus. The hard suction hose compartment shall have a hinged door with push to latch door catches.

The hinged door shall be constructed of smooth material, with chevron striping applied to match the rear of the apparatus body.

HARD SUCTION MOUNTING

One (1) hard suction hose compartment shall be provided at the top of the body compartments, behind the roll up door, on the right side. The design shall allow the hose to be individually removed from the rear of the apparatus. The hard suction hose compartment shall have a hinged door with push to latch door catches.

The hinged door shall be constructed of smooth material, with chevron striping applied to match the rear of the apparatus body.

SUCTION HOSE SOURCE

New suction hose shall be provided by the body builder.

FOLDING STEPS LEFT SIDE FRONT

Three (3) folding steps of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The step shall be installed on the left side front compartment face.

AUXILIARY FIXED STEP RIGHT PUMP PANEL

Three (3) Cast Products 8" square cast aluminum auxiliary steps shall be provided. The steps shall comply to NFPA #1901 non-slip standards and shall be installed on the right side front compartment face.

FRONT BODY PROTECTION PANELS

Aluminum tread plate overlays and panels shall be installed on the front of the body compartment from the lower edge to the top of the compartment doors.

CATWALKS

Painted catwalks shall be installed on the top of the compartments.

INTERFACE HOSE HOOKS

One (1) pair of removeable, pole style interface hose poles shall be installed on the rear of the body.

REAR BODY PROTECTION PANELS

The rear body panels of the body shall be a smooth material, to allow for the proper application and installation of a "Chevron" stripe on the rear.

FUEL TANK ACCESS PANEL

There shall be a removable panel in the rear compartment, used to gain access to the fuel tank and fuel gauge-sending unit.

FOLDING STEPS LEFT SIDE REAR

Two (2) folding steps of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The steps shall be installed on the rear left side of the body.

FOLDING STEPS RIGHT SIDE REAR

Two (2) folding steps of die cast high-strength zinc/aluminum alloy, plated with a superior automotive grade chrome finish shall be provided. The greater than 42 sq. in. serrated non-skid step traction area also offers an oversized non-slip grasp hand-hold. A heavy duty stainless steel spring design firmly holds the step in the open or closed positions. A rubber stop prevents any transit noise and rattles in the closed position. Step lighting shall be from a LED light mounted above the step.

The step has been third part tested to assure conformation of NFPA 1901 and FHA, 49CFR specifications for stepping surfaces and handhold.

The steps shall be installed on the rear right side of the body.

REAR STEP HAND RAILS

Two (2) exterior lighted hand rails, approximately 30" in length, shall be vertically mounted on the rear, one (1) on each side of the body. The hand rail shall be made of 1.25” diameter extruded aluminum to enable non-slip assistance with a gloved hand and mounted on stanchions. The hand rails shall feature blue LED lighting which shall illuminate when the park brake is engaged.

HAND RAIL BELOW HOSEBED

One (1) exterior lighted hand rail, approximately 48" in length, shall be horizontally mounted below the hosebed on the rear of the apparatus body. The hand rail shall be made of 1.25” diameter extruded aluminum to enable non-slip assistance with a gloved hand and mounted on stanchions. The hand rail shall feature blue LED lighting which shall illuminate when the park brake is engaged.

>>Install on intermediate step

EXTRUDED ALUMINUM RUB RAILS

Full body length polished aluminum rub rails shall be bolted in place on the lower right and left body sides. The side rub rails shall be a heavy extruded aluminum "C" channel.

NYLON SPACERS FOR RUB RAILS

There shall be nylon spacers provided between the rub rail and the body. This shall allow wash out and replacement in the event of damage.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the left side of the apparatus, ahead of the rear wheels.

One (1) fire extinguisher storage compartment shall be provided in the rear wheel well area. The compartment shall be designed with ample room for the specified extinguisher. A painted aluminum door shall be installed.

One (1) one-inch (1") wide loop of black webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in case of door failure. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the left side of the apparatus, behind of the rear wheels.

FUEL FILL DOOR

A painted aluminum fuel fill door shall be installed in the left side rear wheel well. A label indicating DIESEL FUEL ONLY shall be applied.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the right side of the apparatus, ahead of the rear wheels.

One (1) fire extinguisher storage compartment shall be provided in the rear wheel well area. The compartment shall be designed with ample room for the specified extinguisher. A painted aluminum door shall be installed.

One (1) one-inch (1") wide loop of black webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in case of door failure. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

WHEEL WELL PROVISION LOCATION

The wheel well provisions shall be located on the right side of the apparatus, behind of the rear wheels.

One (1) fire extinguisher storage compartment shall be provided in the rear wheel well area. The compartment shall be designed with ample room for the specified extinguisher. A painted aluminum door shall be installed.

One (1) one-inch (1") wide loop of black webbing shall be installed in each SCBA compartment to prevent the bottle from sliding out of the compartment in case of door failure. The loop shall be mounted, centered in the compartment and shall hang within one-inch (1") of the compartment floor to allow the bottle to pass by the strap when the bottle is placed in the compartment. The strap shall loop over the valve.

UPPER BODY SIDE COMPARTMENT

Two (2) upper body compartment shall be provided top of body with dimensions of approximately 60" and 12" to 20" deep.

The compartment shall have a lift-up door installed, constructed of 1/8" aluminum tread plate. The door shall have a stainless steel hinge and dual gas openers. The door opening shall be flanged upward 1" to prevent water from running into compartments when the door is closed. Two (2) heavy duty socket and plunger latches shall be installed to hold the door along with a heavy duty chrome grab handle to lift the door.

The compartment shall be located on the left side of the body.

COMPARTMENT EXTERIOR FINISH

The roof compartments shall be constructed from smooth aluminum painted to match the apparatus body.

COMPARTMENT DIVIDER

One (1) brushed aluminum divider designed to segment the roof top compartment shall be installed. The divided shall be installed lengthwise in the compartment.

The floor areas of the up to 30" long roof compartments shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 9/16" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LED light fixtures shall be installed. The lights shall be recessed mounted in compartment door pan. The lights shall be clear.

The compartment light will be controlled by an automatic "On-Off" switch located on each

compartment door.

UPPER BODY SIDE COMPARTMENT

Two (2) upper body compartment shall be provided top of body with dimensions of approximately 90" and 12" to 20" deep.

The compartment shall have a lift-up door installed, constructed of 1/8" aluminum tread plate. The door shall have a stainless steel hinge and dual gas openers. The door opening shall be flanged upward 1" to prevent water from running into compartments when the door is closed. Two (2) heavy duty socket and plunger latches shall be installed to hold the door along with a heavy duty chrome grab handle to lift the door.

The compartment shall be located on the right side of the body.

COMPARTMENT EXTERIOR FINISH

The roof compartments shall be constructed from smooth aluminum painted to match the apparatus body.

ROOF COMPARTMENT DOOR

One (1) lift up door, constructed of aluminum tread plate with aluminum box pan shall be provided. The door shall have a stainless steel hinge and one latch. The door shall be located on the rear of the rooftop cabinet above the rear panel of the apparatus.

The floor areas of the up to 30" long roof compartments shall be fitted with removable vinyl Turtle Tile matting. The matting shall be interlocking modules approximately 12" square by 9/16" thick. This material shall be resistant to heat, cold, ultra-violet radiation, mechanical impacts, chemical actions and is corrosion resistant.

COMPARTMENT LIGHTS

Two (2) LED light fixtures shall be installed. The lights shall be mounted on the compartment door. The lights shall have a clear lens.

The compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

INVERTER

There shall be a DC to AC power inverter system with a 30-amp AC transfer switch furnished on the apparatus. The shore power shall be connected to the system AC output receptacle to supply power to the AC load. When the vehicle is underway and the shoreline power is disconnected,

the automatic transfer switch connects the AC output receptacle to the power inverter that obtains power from the 12-volt battery system.

The Inverter shall be a Vanner model IQC12-2600 AC with the following features and components:

- 2600-Watt Power Inverter
- Automatic Transfer Switch
- Underwriters Laboratories Listed and Certified.
- On Board Battery Charger

LINE VOLTAGE WIRING INSTALLATION

Line voltage wiring in the apparatus shall be with Type SO or approved cable suitable for mobile applications. The flexible electrical cable shall have 600-volt insulation rated for at least 194 degrees F. All junction boxes shall conform to the National Electric Code and shall be accessible for service.

Electrical cable shall be supported within 6 inches of any junction box and at a minimum of every 24 inches of run. Supports shall be made of corrosion protected metal that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

Electrical cable shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be separated by a minimum of 12 inches from exhaust piping or properly shielded and separated from fuel lines by a minimum of 6 inches distance.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

WINCH RECEIVERS - SIDE BODY

The body shall be equipped with one (1) receiver assembly for high or low angle rescue or winch applications. The receiver shall be a square steel tube, same size as that of a trailer hitch. The unit shall be attached to the body sub-frame assembly or chassis frame rails and shall be located behind the rear wheels.

>>One (1) each side of body, behind rear axle.

NO 12V Winch Power Receptacle

ROPE TIE OFF

One (1) slide in receiver unit shall be provided with the apparatus and shall be same size as a trailer hitch receiver. The unit shall be equipped with a drop forged eye unit with a 2.5" inside diameter.

PAINT - LETTERING and STRIPING

BODY PAINT PROCESS

All bright metal fittings, if unavailable in stainless steel shall be heavily chrome plated. Iron fittings shall be copper plated prior to chrome plating. If applicable, any and all accessory times shall be removed from the body prior to cleaning and painting. Any accessory items that are to be painted, shall be painted separately and installed after the body is painted and cured.

All seams shall be caulked, both inside and along the exterior edges, with a urethane automotive sealant to prevent moisture from entering between any body panels.

The body and all parts shall be thoroughly washed with a grease cutting solvent (PPG CFX436) prior to any sanding. After the body has been sanded and the weld marks and minor imperfections are filled and sanded, the body shall be washed again with (PPG CFX436) to remove any contaminants on the surface.

The next two to four coats (depending on need) shall be a PPG DelFleet F4936 High Solids Epoxy Gray Primer. The film build shall be 4-6 mils when dry. The primer surfacer coat, after appropriate dry time, shall be sanded with 320-600 grit sandpaper to ensure maximum gloss of the paint. The last step is the application of at least three coats of PPG DelFleet polyurethane FBC-color, the film build being 2-3 mils dry. Followed by three coats PPG DelFleet F3906 high build clear, the film build being 2-3 mils dry. This shall provide a UV barrier to prevent fading and chalking.

All products and technicians are certified by PPG every two (2) years.

APPARATUS COLOR

The apparatus shall be ____ in color.

INTERIOR COMPARTMENT FINISH

The interior compartment walls shall be coated with Line-X. The compartments shall be cleaned with a wax and grease remover and then caulked with a urethane caulk. The lining material shall dry to form an impervious one piece covering to protect the compartment interiors from damage. The Line-X shall be applied on eight (8) compartments.

INTERIOR COMPARTMENT FINISH

The lining material shall be grey in color.

ROOF INTERIOR COMPARTMENT FINISH

The roof interior compartment walls and floor shall be coated with Line-X material. The lining material shall dry to form an impervious one piece covering to protect the compartment interiors from damage. The Line-X shall be applied on four (4) compartments.

TOUCH-UP PAINT

One (1) two (2) ounce bottle of touch-up paint shall be furnished with the completed truck at final delivery.

BLACKED OUT ITEMS - LINE-X / PAINT

The following items shall be either blacked out with Line-X or flat black paint.

- One (1) Speaker Cover(s) shall be finished with flat black paint.

-One (1) Q2B Grill/Shroud shall be finished with flat black paint.

- One (1) pair of air horns (2) shall be finished with flat black paint.

-One (1) bumper apron (flat areas) shall be finished with black Line-X.

- One (1) pair of running boards shall be finished with black Line-X.

- One (1) rear step shall be finished with black Line-X.

- One (1) intermediate step shall be finished with black Line-X.

- One (1) pair of hose bed covers shall be finished with black Line-X.

- One (1) crosslay cover shall be finished with black Line-X.

The driver and passenger side coffin compartment cover(s) shall be finished with black Line-X.

- One (1) body trim (Front of Body 12") shall be finished with black Line-X.

LETTERING

The purchaser shall supply the apparatus lettering.

REFLECTIVE STRIPING

The purchaser shall supply reflective striping for the apparatus in compliance to applicable NFPA standards.

CHEVRON STRIPING

The entire rear portion of the body shall have Oralite V98 reflective red and yellow striping installed. The chevron style striping shall be applied at a 45-degree upward angle pointing towards the center upper portion of the rear panel.

INTERIOR CAB DOOR CHEVRON

Oralite V98 reflective striping shall be installed on the interior of each chassis door. The lower portion of the doors shall have a scotchlite red and yellow chevron striping applied to it. A reflective stripe shall also be applied on the vertical outer edge of each cab door.

Custom Cab

YELLOW SAFETY TAPE - STANDING & WALKING SURFACES

The apparatus shall be NFPA standard 15.7.1.6 designating any horizontal standing or walking surface higher than 48-in (1220 mm) from the ground and not guarded by railing or structure at least 12-in (300 mm) high shall have at least a 1-in (25 mm) wide safety yellow line delineation that contrasts with the background to mark the outside perimeter of the designated standing or walking surface area, excluding steps and ladders.

LOOSE EQUIPMENT

WHEEL CHOCKS

Two (2) standard aluminum wheel chocks shall be provided.

ROOF LADDER

One (1) Duo Safety Model 775-A, 14 foot aluminum roof ladder with folding steel roof hooks on one end and steel spikes on the other end shall be provided on the apparatus. The ladder shall meet or exceed all latest NFPA Standards.

EXTENSION LADDER

One (1) Duo-Safety Model 900-A, 24 foot two (2) section aluminum extension ladder shall be provided on the apparatus. The ladder shall meet or exceed all the latest NFPA standards.

FOLDING LADDER

One (1) Duo Safety Model 585-A, 10 foot folding aluminum ladder shall be provided on the apparatus. The ladder shall meet or exceed all the latest NFPA Standards.

ROOF HOOK

One (1) 6-ft Fire Hooks Unlimited NY style Roof Hook with grips shall be provided.

ROOF HOOK

One (1) 8-ft Fire Hooks Unlimited NY style Roof Hook with grips shall be provided.

TRASH HOOK

One (1) 6-ft Fire Hooks Unlimited arson/trash hook with fiberglass "D" handle shall be provided.

SUCTION HOSE

Two (2) 6.0" x 10 foot length of PVC flexible suction hose shall be supplied. The suction hose shall have light weight couplings provided.

HOSE COUPLINGS

Light weight aluminum couplings shall be provided on the suction hose. A long handle female swivel shall be provided on one end and a rocker lug male shall be provided for the other end.

STRAINER

One (1) Kochek Model BS60 barrel strainer shall be provided. The strainer shall be constructed from aluminum with K-Brite finish and include a tie off loop on the end plate. The strainer shall be provided with a 6.0" NST female coupling.

WARRANTIES

BODY WARRANTY

We warrant each new motorized fire apparatus manufactured by ROSENBAUER AMERICA, LLC for a period of TWO YEARS from the date of delivery, except for chassis and other components noted herein.

Under this warranty we agree to furnish any parts to replace those that have failed due to defective material or workmanship where there is no indication of abuse, neglect, unusual or other than normal service providing that such parts are, at the option of ROSENBAUER AMERICA, LLC, made available for our inspection at our request, returned to our factory or other location designated by us with transportation prepaid within thirty days after the date of failure or within two (2) years from the date of delivery of the apparatus to the original purchaser, whichever occurs first, and inspection indicates the failure was attributed to defective material or workmanship.

The warranty on the chassis and chassis supplied components, storage batteries, generators, electrical lamps and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for the same are to be made directly with the manufacturer by the customer.

This warranty will not apply to any fire apparatus that has been repaired or altered outside our factory in any way, which in our opinion might affect its stability or reliability.

This warranty shall not apply to those items that are usually considered normal maintenance and upkeep services: including, but not limited to, normal lubrication or proper adjustment of minor auxiliary pumps or reels.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability in connection with the sales of our apparatus unless made in writing by ROSENBAUER AMERICA, LLC.

ALUMINUM BODY WARRANTY - TEN YEAR

Rosenbauer America, LLC warrants to the original purchaser only, that the all aluminum body, fabricated by Rosenbauer America, LLC, under normal use and with reasonable maintenance, be structurally sound and will remain free from corrosion perforation for a period of TEN (10) years.

This warranty does not apply to the following items that are covered by a separate warranty: paint finish, hardware, moldings, and other accessories attached to this body. In addition, this warranty does not apply to any part or accessory manufactured by others and attached to this body.

ROSENBAUER AMERICA, LLC MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO THE ALUMINUM BODY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND HEREBY DISCLAIMED.

Rosenbauer America, LLC will replace without charge, repair or make a fair allowance for any defect in material or workmanship demonstrated to its satisfaction to have existed at the time of delivery or not due to misuse, negligence, or accident. If Rosenbauer America, LLC elects to repair this body, the extent of such repair shall be determined solely by Rosenbauer America, LLC, and shall be performed solely at the Rosenbauer America, LLC factory, or at an approved facility. The expense of any transportation to or from such repair facility shall be borne by the purchaser and is not an item covered under this warranty.

Rosenbauer America, LLC will not be liable for damages and under no circumstances will its liability exceed the price for a defective body. The remedies set forth herein are exclusive and in substitution for all other remedies to which the purchaser would otherwise be entitled.

Rosenbauer America, LLC will be given a reasonable opportunity to investigate all claims. The purchaser must commence any action arising out of, based upon or relating to agreement or the breach hereof, within twelve months from the date the cause of the action occurred.

Note: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

GALVANIZED SUBFRAME WARRANTY

Subject to the provisions, limitations and conditions set forth in this warranty, Rosenbauer America, LLC (hereby referred to as "seller"), hereby warrants to each original purchaser only that each new hot dip galvanized body subframe (exclusive of paint finish and hardware) is structurally sound and free of all structural defects of both material and workmanship and further warrants that it will maintain such structural integrity for the duration of ownership by the original purchaser. This warranty terminates upon transfer of possession or ownership by

original purchaser.

This warranty is conditioned upon normal use and reasonable maintenance of such subframe; prompt written notice of all defects to seller or one of the seller's then authorized dealers in the area; no repair or additions there to except by seller or authorized by it; said defect not resulting from misuse, negligence, accident, remount, overloading beyond applicable weight rating by customer or third parties. If any such conditions are not complied with, this warranty shall become void and unenforceable.

Should repairs become necessary under the terms or the warranty, the extent of that repair shall be determined solely by the seller and shall be performed solely at Rosenbauer America, LLC or a repair facility designated by the seller. The expense of any transportation to or from such repair facility shall be that of the purchaser and is not an item covered by this warranty.

Seller reserves the unrestricted right at any time from time to time to make changes in the design of and/or improvements on its products without thereby imposing any obligation on itself to make corresponding changes or improvements in or on its products theretofore manufactured.

EXCLUSIONS AND LIMITATIONS: THIS MANUFACTURER'S WARRANTY IS PROVIDED IN PLACE OF ANY AND ALL OTHER REPRESENTATIONS OR IMPLIED WARRANTIES. NO PERSON IS AUTHORIZED TO MAKE ANY REPRESENTATIONS OR WARRANTY ON BEHALF OF ROSENBAUER AMERICA, LLC OR ANY OF ITS DISTRIBUTORS OTHER THAN SET FORTH IN THIS MANUFACTURER'S WARRANTY. YOUR RIGHT TO SERVICE AND REPLACEMENT OF PARTS ON THE TERMS EXPRESSLY SET FORTH HERIN ARE YOUR EXCLUSIVE REMEDIES AND NEITHER THE MANUFACTURER NOR ANY OF ITS DISTRIBUTORS SHALL BE LIABLE FOR DAMAGES, WHETHER ORDINARY, INCIDENTAL OR CONSEQUENTIAL.

Note: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

PRO RATED PAINT WARRANTY TEN YEAR

TERMS AND CONDITIONS

Rosenbauer hereby warrants the paint on the body of each new fire & rescue vehicle to be free from blistering, peeling, corrosion or any other adhesion defect caused by defective manufacturing methods or paint material selection for a period of ten (10) years, starting on the date the vehicle is delivered to the original purchaser. Under this warranty, Rosenbauer agrees to furnish any item or items to replace those that have been found to be defective in material or workmanship where there is no indication of abuse, neglect or other than normal service. Such an item or items, at the option of Rosenbauer must be made available for our inspection at our request and returned to our factory or another location designated by Rosenbauer. Transportation of such an item or items will be arranged and covered by buyer within thirty (30) days after the date of failure and with ten

(10) years from the date of delivery of the apparatus to the original purchaser. The inspection must indicate that the failure was attributed to an adhesion defect caused by defective manufacturing methods or paint material selection. Authorization for repair must be sought from Rosenbauer customer service department prior to repair occurring.

PRO-RATED WARRANTY COVERAGE

Color Retention & Cracking	Adhesion, Blistering & Bubbling	Corrosion, Dissimilar Metal
0-72 Months = 100%	0-36 Months = 100%	0-36 Months = 100%
73-96 Months = 50%	37-84 Months = 50%	37-48 Months = 50%
97-120 Months = 25%	85-120 Months = 25%	73-120 Months = 25%

THIS WARRANTY SHALL NOT APPLY TO OR COVER THE FOLLOWING:

- Any item that has been repaired, repainted or altered by a facility not approved in advance by Rosenbauer.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any defect resulting from misuse, negligence, alteration, accident or lack of normal or required maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.
- Painted items which are manufactured by a party other that Rosenbauer and which are separately warranted by that party including cabs not manufactured or painted by Rosenbauer.

EXCLUSIONS OF DAMAGES BOTH INCIDENTAL AND CONSEQUENTIAL

At no time shall Rosenbauer be held liable for any incidental, consequential, indirect, special and/or punitive damages whatsoever, whether coming from breach of contract, warranty, tort or equity. Such items shall include the chassis or other items sold by Rosenbauer, or their operation or their failure to operate, or defects herein or any undertakings, acts or omissions related to, regardless whether Rosenbauer's knowledge of the possibility of any such damage.

Without limitation of the generality of the preceding statements, Rosenbauer categorically disclaims any and all liability for property and personal injury, damage, penalties for lost revenue and/or profit, loss of chassis or products and associated pieces of equipment, the expense of substituting chassis and/or products or the out of service expenses, resulting from damages and/or delays that creates down time expense and/or create economic losses, or any third party claims for damages.

This warranty in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability

or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

LETTERING WARRANTY

Rosenbauer America, LLC warrants to the original purchaser only, that the lettering and striping, installed by Rosenbauer America, LLC, will remain free from defects for a period of one (1) year under normal use.

Rosenbauer America, LLC will replace without charge, repair or make a fair allowance for any defect in material or workmanship demonstrated to its satisfaction to have existed at the time of delivery or not due to misuse, negligence, or accident. If Rosenbauer America, LLC elects to repair this item, the extent of such repair shall be determined solely by Rosenbauer America, LLC, and shall be performed solely at the Rosenbauer America, LLC factory, or at an approved facility. The expense of any transportation to or from such repair facility shall be borne by the purchaser and is not an item covered under this warranty.

PUMP WARRANTY

Rosenbauer America, LLC (Rosenbauer) warrants, to the original buyer only, that products and parts manufactured by Rosenbauer America, LLC will be free from defects in material and workmanship under normal use and service for a period of five (5) years from the date the product is first placed in service, provided the buyer notifies Rosenbauer in writing, of the defect in said product within the warranty period, and said product is found by Rosenbauer America to be conforming with the aforesaid warranty.

When required in writing by Rosenbauer, defective products must be promptly returned by the buyer to the Rosenbauer plant or at such other place as may be specified by Rosenbauer with transportation and other charges prepaid. A Return Goods Authorization (RGA) is required for all products and parts and may be requested by phone, fax or mail. The aforesaid warranty excludes any responsibility or liability of Rosenbauer America, LLC for:

A. Damages or defects due to accident, abuse, misuse, abnormal operating conditions, negligence, accidental causes or improper maintenance, or attributable to written specifications or instructions furnished by buyer;

B. Defects in products manufactured by others and furnished by Rosenbauer America hereunder, it being understood and agreed by the parties that the only warranty provided for such products shall be the warranty provided by the manufacturer thereof which, if assignable, Rosenbauer America will assign to the buyer, if requested by Buyer;

C. Any product or part, altered, modified, serviced or repaired other than by Rosenbauer America, without its prior written consent.

D. The cost of dismantling, removing, transporting, storing, or insuring the defective product or part and the cost of reinstallation.

E. Normal wear items (packing, strainers, filters, light bulbs, anodes, intake screens, etc.)

All other warranties are excluded, whether expressed or implied by operation of law or otherwise, including all implied warranties of merchantability or fitness for purpose. Rosenbauer America shall not be liable for consequential or incidental damages directly or indirectly arising or resulting from breach of any of the terms of this limited warranty or from the sale, handling, or use of any other product or part. Rosenbauer America liability hereunder, either for breach of warranty or for negligence, is expressly limited at Rosenbauer America option:

A. To the replacement at the agreed point of delivery of any product or part, which upon inspection by Rosenbauer America or its duly authorized representative, is found not to conform to the limited warranty set forth above, or

B. To the repair of such product or part, or

C. To the refund or crediting to buyer of the net sales price of the defective product or part.

Buyer's remedies contained herein are exclusive of any other remedy otherwise available to the buyer.

STAINLESS STEEL PLUMBING WARRANTY

The manufacturer shall provide a ten (10) year warranty on the stainless steel plumbing components and installation. The manufacturer shall supply details of their warranty information with their bid submission.

FOAM TANK WARRANTY

UNITED PLASTIC FABRICATION INC. Warrants each UPF POLY-TANK IIE Booster/Foam tank to be free from manufacturing defects in material and workmanship for the service life of the vehicle (vehicle must be actively used in fire suppression). The UPF POLY-TANK IIE must be installed in accordance with the United Plastic Fabricating installation manual. Every UPF POLY-TANK IIE is thoroughly inspected and tested for leaks before leaving our facility. Should any problems develop with your UPF POLY-TANK IIE booster/foam tank and will not meet performance criteria during the service life of the vehicle, notify UPF in writing or call our TOLL FREE SERVICE HOT LINE 1-800-USA-POLY. Provide UPF with the serial number and a description of the problem. If the tank problem would render the truck out of service, UPF will dispatch a service technician WITHIN 48 HOURS (2 DAYS) to repair the tank. (This time period is for North America only). If the vehicle can remain in service, UPF will dispatch a service technician within a mutually agreed upon time period.

We will repair, or at our option, replace the tank with a new UPF POLY-Tank IIE. UPF will cover customary and reasonable costs to remove and install the UPF POLY-TANK IIE. This warranty will not cover tanks that have been improperly installed, misused or abused, and the serial number must not have, been altered, defaced or removed. UPF will not cover any unauthorized third party repairs or alterations. Any of these actions may void the warranty.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF UNITED PLASTIC FABRICATION, INC.

This warranty contains the entire warranty. It is the sole warranty and price agreements or representation, whether oral or written, are either merged herein or expressly cancelled. UNITED PLASTIC FABRICATION, INC. Neither assumes, nor authorizes any person supposing to act on its behalf, to change, nor assume for it, any warranty or liability concerning its product.

IN NO EVENT WILL UNITED PLASTIC FABRICATION, INC BE LIABLE FOR AN AMOUNT IN EXCESS OF THE PRESENT RETAIL, PURCHASE PRICE PLUS INSTALLATION AND REMOVAL COST OF THE BOOSTER TANK, FOR ANY LOSS OR DAMAGE, WHETHER DIRECT OR INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHERWISE ARISING OUT OF FAILURE OF ITS PRODUCT.

This warranty gives you specific legal rights, and you may have other rights, which vary from state to state. Some states do not allow exclusion or limitation of incidental of incidental or consequential damage, so the above limitation or exclusion may not apply to you. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

WATER TANK WARRANTY

UNITED PLASTIC FABRICATION INC. Warrants each UPF POLY-TANK IIE Booster/Foam tank to be free from manufacturing defects in material and workmanship for the service life of the vehicle (vehicle must be actively used in fire suppression). The UPF POLY-TANK IIE must be installed in accordance with the United Plastic Fabricating installation manual. Every UPF POLY-TANK IIE is thoroughly inspected and tested for leaks before leaving our facility. Should any problems develop with your UPF POLY-TANK IIE booster/foam tank and will not meet performance criteria during the service life of the vehicle, notify UPF in writing or call our TOLL FREE SERVICE HOT LINE 1-800-USA-POLY. Provide UPF with the serial number and a description of the problem. If the tank problem would render the truck out of service, UPF will dispatch a service technician WITHIN 48 HOURS (2 DAYS) to repair the tank. (This time period is for North America only). If the vehicle can

remain in service, UPF will dispatch a service technician within a mutually agreed upon time period.

We will repair, or at our option, replace the tank with a new UPF POLY-Tank IIE. UPF will cover customary and reasonable costs to remove and install the UPF POLY-TANK IIE. This warranty will not cover tanks that have been improperly installed, misused or abused, and the serial number must not have, been altered, defaced or removed. UPF will not cover any unauthorized third party repairs or alterations. Any of these actions may void the warranty.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF UNITED PLASTIC FABRICATION, INC.

This warranty contains the entire warranty. It is the sole warranty and price agreements or representation, whether oral or written, are either merged herein or expressly cancelled. UNITED PLASTIC FABRICATION, INC. Neither assumes, nor authorizes any person supposing to act on its behalf, to change, nor assume for it, any warranty or liability concerning its product.

IN NO EVENT WILL UNITED PLASTIC FABRICATION, INC BE LIABLE FOR AN AMOUNT IN EXCESS OF THE PRESENT RETAIL, PURCHASE PRICE PLUS INSTALLATION AND REMOVAL COST OF THE BOOSTER TANK, FOR ANY LOSS OR DAMAGE, WHETHER DIRECT OR INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHERWISE ARISING OUT OF FAILURE OF ITS PRODUCT.

This warranty gives you specific legal rights, and you may have other rights, which vary from state to state. Some states do not allow exclusion or limitation of incidental of incidental or consequential damage, so the above limitation or exclusion may not apply to you. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

PAINT WARRANTY FIVE YEAR

The PPG paint performance guarantee will cover the areas of the vehicle finished with the specified product for a period of FIVE (5) years beginning the day the vehicle is delivered to the purchaser.

The full apparatus chassis, manufactured and painted by Rosenbauer Motors, LLC, shall be covered for the following paint failures as outlined on the guarantee certificate:

- Peeling or delaminating of the topcoat and/or other layers of paint.
- Cracking or checking.

- Loss of gloss caused by cracking, checking, or hazing.
- Any paint failure caused by defective PPG Fleet Finishes, which are covered by this guarantee.

All guarantee exclusions, limitations, and methods of claims are covered in the full certificate provided to the original purchaser.

Note: Surety bond, if required, will cover standard one-year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

CAB STRUCTURE WARRANTY

The cab structure shall be warranted for a period of ten (10) years with the complete detail of the warranty outlined in a document provided upon request.

TRANSMISSION WARRANTY

The Allison EVS transmission shall be warranted for a period of five (5) years with the complete detail of the warranty outlined in a document provided upon request.

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever comes first, with the complete detail of the warranty outlined in a document provided upon request.

FRAME WARRANTY

The frame and cross members shall carry a lifetime warranty with the complete detail of the warranty outlined in a document provided upon request.

FRONT AXLE WARRANTY

The front axle shall be warranted by Hendrickson for five (5) years or 500,000 miles, whichever comes first, under the general service application.

REAR AXLE WARRANTY

The rear axle(s) shall be warranted by Meritor for five (5) years with unlimited miles under the general service application.

CAB AND CHASSIS WARRANTY

The cab and chassis shall carry a twelve (12) month warranty providing limited parts and labor from the date the complete apparatus is delivered to the end user. The complete detail of the warranty shall be outlined in a document provided upon request.

MISCELLANEOUS

BODY MANUAL - PRINTED WITH DIGITAL COPY

Rosenbauer shall provide with the vehicle upon delivery, one (1) complete delivery manual. This manual shall be in a notebook type binder, with reference tabs for each section of the vehicle. In addition to the printed material, a digital copy shall be provided.

Within each section shall be:

- Individual component manufacturer instruction and parts manuals
- Warranty forms for the body
- Warranty forms for all major components
- Warranty instructions and format to be used in compliance with warranty obligations
- Wiring diagrams
- Installation instruction and drawings for major parts
- Visual graphics and electronic photos for the installation of major parts
- Necessary normal routine service forms, publications and components of the body portion of the apparatus
- Technical publications for training and instruction on major body components
- Warning and safety related notices for personnel protection
- Cab and chassis manuals on parts, service and maintenance shall be provided

IN PROCESS PHOTOS

There shall be a series of photos provided as the apparatus progresses through the production process. There will be a minimum of four (4) photos per interval and a total of six intervals, one (1) upon chassis arrival, four (4) during construction and one (1) upon completion.

CONTRACT CHANGE NOTICE

The quoted delivery time is based upon our receipt of the specified materials required to produce the apparatus in a timely manner. "Delivery" means the date company is prepared to make physical possession of vehicle available to customer.

The Company shall not be responsible nor deemed to be in default on account of delays in performance due to causes which are beyond the Company's control which make the Company's performance impracticable, including but not limited to civil wars, insurrections, strikes, riots, fires, storms, floods, other acts of nature, explosions, earthquakes, accidents, any act of government, delays in transportation, inability to obtain necessary labor supplies or manufacturing facilities, allocation regulations or orders affecting materials, equipment, facilities or completed products, failure to obtain any required license or certificates, acts of God or the public enemy or terrorism, failure of transportation, epidemics, quarantine restrictions, failure of vendors (due to causes similar to those within the scope of this clause) to perform their contracts or labor troubles causing cessation, slowdown, or interruption of work.

After execution and acceptance of this Purchase Process, the Buyer may request that the Company incorporate a change to the Products or the Specifications for the Products by delivering a Change Order to the Company; provided, however, that any such Change Order must be in writing and include a description of the proposed change sufficient to permit the Company to evaluate the feasibility of such Change Order. Within seven (7) working days of receipt of a Change Order, the Company will inform the Buyer in writing of the feasibility of the Change Order, the earliest possible implementation date for the Change Order, of any increase or decrease in the Purchase Price resulting from such Change Order, and of any effect on production scheduling or delivery resulting from such Change Order. The Company shall not be liable to the Buyer for any delay in performance or delivery arising from any such Change Order. Purchase Price may be modified only by mutual written agreement of the Parties because of changes to the Apparatus required or requested by the Buyer during the construction process pursuant to Appendix C, Change Order Policy. Any changes in the Purchase Price resulting from changes to the Apparatus required or requested by the Buyer during the construction process shall be stated in the Change Order signed by both parties. Additional Changes: If various state or federal regulatory agencies (e.g. NFPA, DOT, EPA) require changes to the specification and/or the product that result in a cost increase to comply therewith this cost will be added to the Purchase Price to be paid by the customer.

FINANCIAL STABILITY SPECIFICATIONS

With high-profile instances of fire apparatus manufacturers encountering financial difficulties, it is imperative that fire departments be diligent in evaluating the financial position of the companies they solicit to build on their emergency response vehicles. A contract entered into with a company on shaky ground is a dangerous prospect, since conducting business with a manufacturer in such condition could open the department to monumental problems.

Take, for instance, the growing theme of manufacturers *requiring* as opposed to *offering* pre-payment and progressive payment options with a corresponding discount off the price of a vehicle. Such offers are made with an ulterior motive in mind, as it can be generally inferred that manufacturers requiring pre-payments and progressive payments do so because they need your cash *today* to fund production of other vehicles already in the backlog.

Should problems arise, as has been the case in situations too numerous to mention, your department risks losing any down payments already made or even the entire cost of a piece of equipment should certain pre-pay discount situations go awry.

While pre-payment discounts may be enticing, it is important to know just how stable the manufacturer seeking your funds is before you make that commitment. If you enter into one of these agreements and the manufacturer hits a rough patch, it is you that will be hurting, because your funds may not be recoverable. However, if you enter into a contract with a financially sound manufacturer, you will reap all of the benefits of a well-built truck at a lower cost. You may equally, by taking advantage of the time-value of money, be able to afford more truck than initially thought, because funds saved by leveraging pre-payment options could allow you get some added features that you might not necessarily have been able to afford.

With this in mind, it must be noted that Rosenbauer is a company with rock-solid financial stability. This is a statement not made lightly, as we can prove it to you. We can provide language that you can insert into your bid specifications that stipulates that in order for bids to be accepted by a fire department, the company bidding must meet several fiscal criteria.

The first criteria call for the successful bidder to meet a debt-to-equity ratio not exceeding a 2.0 rating. Rosenbauer presently stands at a 1.51 rating, which is well-below the accepted rating. This low number results from Rosenbauer owning more assets with a marginal debt service. This means we are not using lenders to fund our operations, nor our growth.

The second requirement is that the debt coverage ratio of the successful body builder exceeds a 100 rating. The higher the number, the better able a company is to meet its payment obligations with banks and creditors. Rosenbauer's number is at 279.6, which is nearly three times the required amount. The higher the debt coverage ratio, the easily and more fluidly a company is positioned to pay its monthly obligations and operating costs.

The third criteria require that the equity ratio of the successful bidder must exceed .30 rating. A higher equity ratio indicates that the body builder has increased flexibility to meet its financial obligations which translates into greater financial stability. Rosenbauer currently has an equity ratio of .387 which is well above the accepted rating and an excellent indicator of financial strength.

When exploring and evaluating various manufacturers to consider for building your apparatus, there is little doubt you will find one that stands on as firmly a financial ground as Rosenbauer. While others are experiencing stressful issues that raise doubts as to the company's long-term viability, Rosenbauer continues to demonstrate a strengthening of its financial position in the apparatus manufacturing industry. Because Rosenbauer meets and exceeds all the above-stated financial bid requirements, we are best positioned to ensure customers of a strong relationship with the company, which cannot be claimed by most of our competitors in this volatile market.

The Rosenbauer America Dun and Bradstreet number is 02-447-3584. To acquire a Dun and Bradstreet report, telephone them at 1-800-234-3867 (in Canada 800-463-6362) or visit their web site address at www.dnb.com. Dun and Bradstreet is nationally-recognized, independent financial analysis company.

CENTER OF GRAVITY

The apparatus, prior to acceptance, will be required to meet the vehicle stability of the applicable NFPA Automotive Fire Apparatus Standard.

A calculated center of gravity shall be provided. The calculated or measured center of gravity (CG) shall be no higher that 80-percent of the rear axle track width.

ENGINEERING BLUEPRINTS

ROSENBAUER has submitted "proposal" blueprints which are “representative” of the vehicle being proposed and these have been generated on computer-aided-design (CAD) equipment.

The blueprints are provided as follows:

Sheet No. 1:	Left side exterior view
	Right side exterior view
	Rear exterior view

ROSENBAUER shall be provide construction drawings for approval prior to actual construction of the vehicle.

The design of the equipment is in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements, which might cause injury to personnel or equipment.

All oil, hydraulic, and air tubing lines and electrical wiring shall be located in protective positions properly attached to the frame or body structure and shall have protective loom or grommets at each point where they pass through structural members, except where a through-frame connector is necessary.

Parts and components will be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for best accessibility.

CHANGE ORDERS

To ensure the proper engineering and construction of the purchaser's custom fire apparatus in a timely manner, the contractor shall consider the order final and complete after any changes made during the pre-construction conference are mutually approved. Change orders requested after the pre-construction conference are discouraged. It shall be understood and agreed that any changes, if approved, after the order has been released to Engineering, shall constitute a valid cause for production delay and without penalty to the contractor.

STATIC LOAD SEAT TEST INFORMATION

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

CAB TEST INFORMATION

The cab as built shall have successfully completed the pre-load side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests shall have been witnessed by and attested to by an independent third party. The test results shall have been recorded using cameras, high speed imagers, accelerometers and strain gauges.

Documentation of the testing shall be provided upon request.

CAB INTEGRITY CERTIFICATION

The manufacturer shall provide a cab crash test certification with this proposal including SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading for Heavy Trucks and SAE J2420 COE Frontal Strength Evaluation - Dynamic Load for Heavy Trucks.

CAB TEST INFORMATION

Roof Crush
The cab shall be subjected to a roof crush test of 120,000-pounds exceeding the requirements of ECE 29 criteria. The 120,000-pound requirement is important to ensure to most structurally sound and safe cab in the event of a crash or roll over.

Side Impact
The cab shall be subjected to dynamic moving barrier slammed into the side of the cab at 7.5 mph, striking with an impact of 15,157-foot pounds of energy. This test will closely represent the forces a cab would incur in a rollover incident.

Frontal Impact
The cab shall withstand a frontal force produced from a moving barrier slammed into the front of the cab traveling at 10.5 mph, striking with an impact of 42,587-foot pounds of energy.

The same cab shall withstand all tests without any measurable intrusion into the survival space of the occupant area.

OPERATION AND PARTS LIST MANUALS

Each cab and chassis shall include two (2) electronic copies of the operation manuals and parts listings. The manuals shall include information specific to the components included on the apparatus.

ENGINE AND TRANSMISSION MANUALS

One (1) paper copy of the specific engine and transmission manuals shall accompany each cab and chassis.

AS BUILT WIRING DIAGRAMS

Each cab and chassis shall include one (1) digital copy of the wiring schematics and component wiring. The wiring schematics shall be developed on a software program such as VeSys Design or equal that provides continuity in files and diagram. The software shall allow you to trace through the design schematics to identify cross referenced items such as in-line connectors and wires. The software shall be interactive which allows you to view one electrical assembly drawing, click on a wire routing and the program will take you to the related circuit assembly or termination

point. The software shall also provide a searchable function allowing you to view multiple diagrams using readily available pdf viewers. The digital copy of the wiring schematics shall be compatible with hand held devices such as I-Pads.

USB STORAGE

For ease of service the chassis shall come with an on-board USB flash drive. The flash drive shall have a minimum of 8 GB of storage capacity; and shall be located behind the access panel on the driver side kick panel, next to the data port for the engine.

The following items shall be stored on the Flash Drive. No Exception.

- As built wiring diagrams
- Plumbing diagram
- Chassis, body and aerial manuals

The USB shall be accessible through a 3 foot (3') USB-A to USB-B cable.

ROAD SAFETY KIT

One (1) 2-1/2# ABC DOT Approved fire extinguisher shall be provided. The fire extinguisher shall be shipped loose with the chassis.

One (1) set of DOT approved hazard triangles shall be supplied with the chassis. They shall be stored in a plastic case and shipped loose with the chassis.

One (1) first aid kit
Additional Crossmembers RSD bodies

NFPA 2016 STANDARDS

This unit shall comply with the NFPA standards effective January 1, 2016.

Certification of slip resistance of all stepping, standing and walking surfaces shall be supplied with delivery of the apparatus.

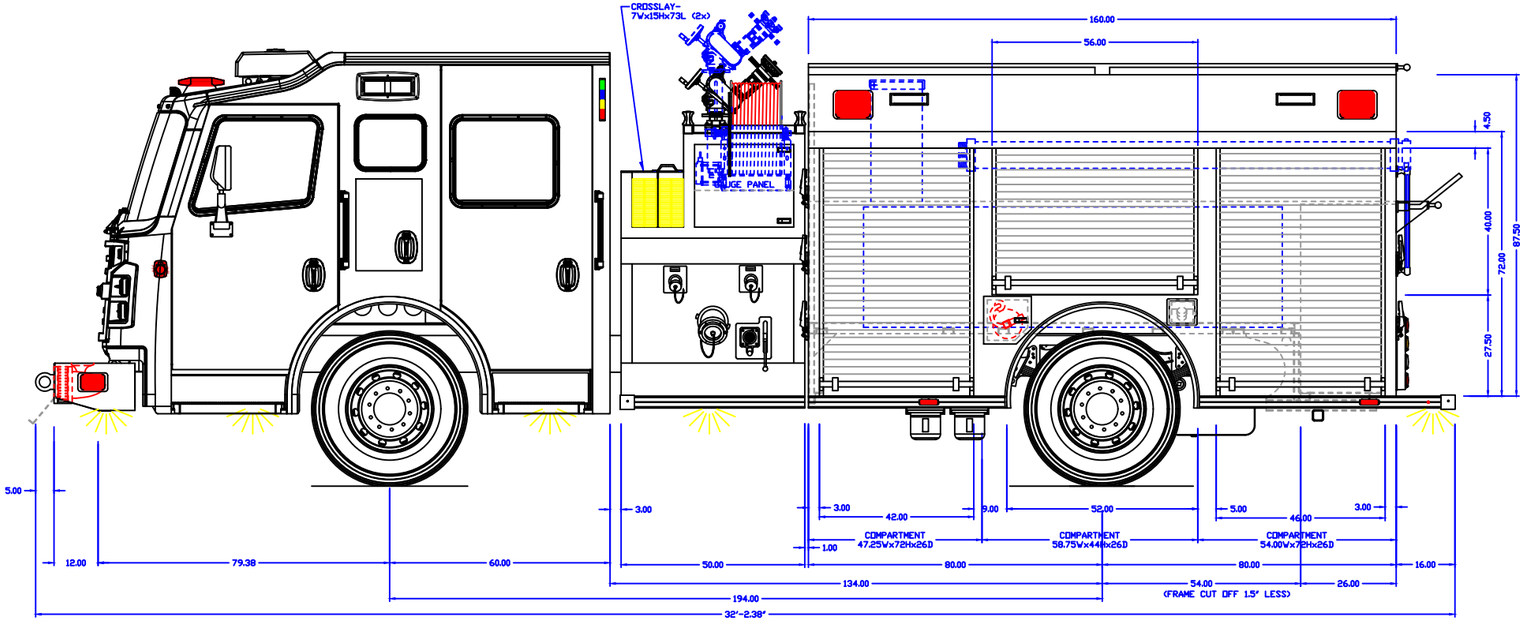
A plate that is highly visible to the driver while seated shall be provided which states the overall height, length, and gross vehicle weight rating.

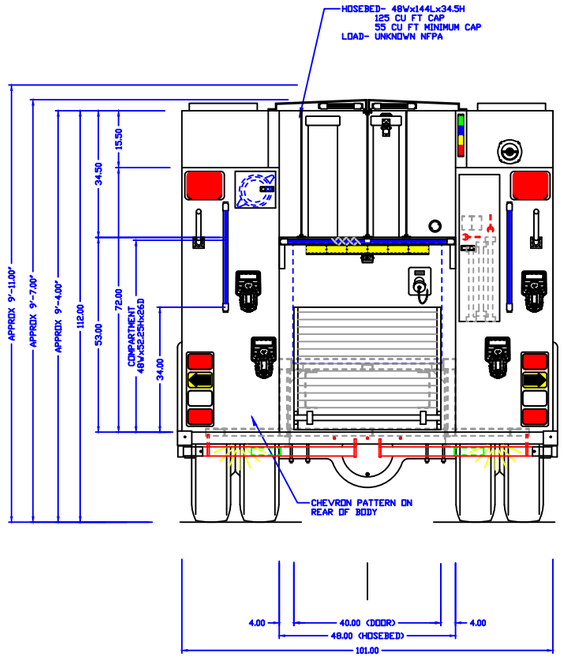
The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.

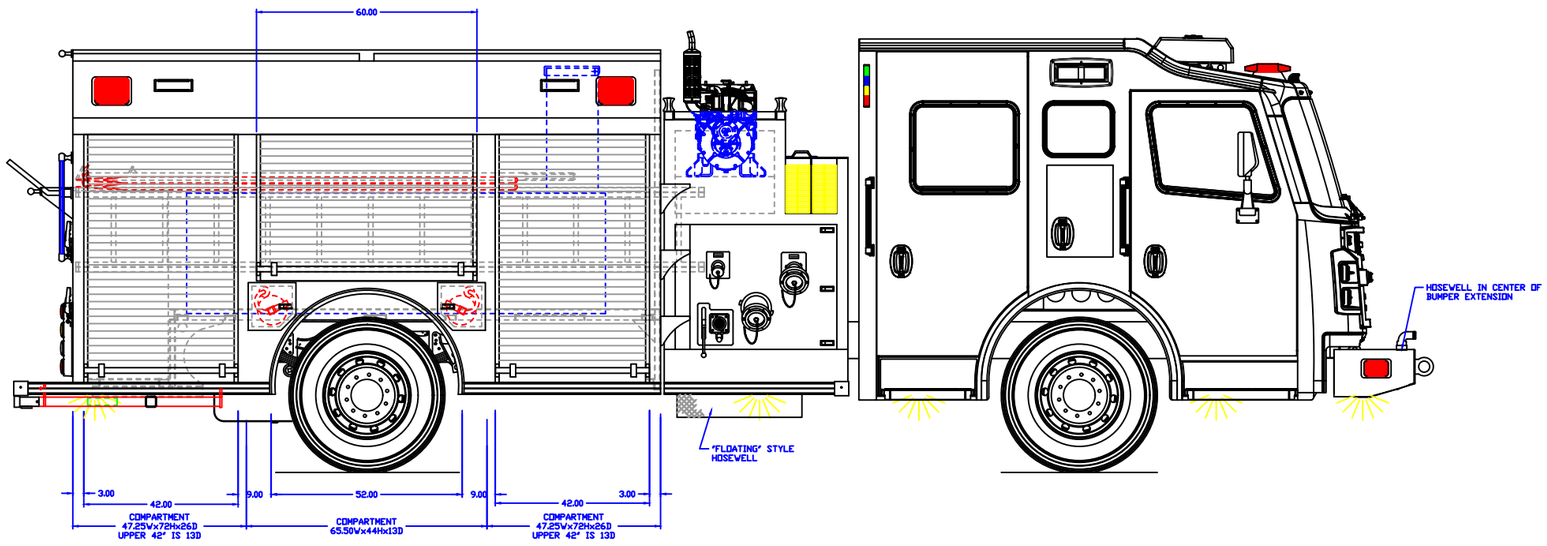
An official of the company shall designate, in writing, which is qualified to witness and certify test results.

Attachment 3 of Exhibit A: Model of Engine

NOTES:
1. OVERALL HEIGHT IS IN LOADED CONDITION. UNLOADED HEIGHTS MAY BE 4" ABOVE HEIGHTS SHOWN.
2. DO NOT SCALE DRAWING.
3. ALL DIMENSIONS ARE APPROXIMATE AND SUBJECT TO ENGINEERING CHANGES.
4. DRAWING MAY OR MAY NOT SHOW ALL ITEMS AS DESCRIBED IN THE WRITTEN DETAIL SPECIFICATIONS.
5. INCLUSION OF AN ITEM ON THE DRAWING DOES NOT CONSTITUTE INCLUSION OF THAT ITEM WITH THE FINAL DELIVERED UNIT.
6. THE EFFECTIVE DOOR OPENINGS WILL BE APPROX. 2" LESS THAN THE NOTED COMPARTMENT OPENING FOR ROLL UP DOORS AND UP TO APPROX. 4" LESS FOR HINGED DOORS







APPROVED BY:

CHASSIS:	COMMANDER 6011
PUMP:	ROSENBAUER 1500 GPM
TANK:	POLY/500/30(FOAM)
PANEL MATL:	LINE X
COMP INTERIOR:	LINE X
MAXIMUM HEIGHT	NONE
MAXIMUM LENGTH	NONE
BODY WIDTH	101"

REVISED:	WLM	DATE: 06-18-21
DRAWN:	WLM	DATE: 04-29-20

MADERA CITY FIRE DEPT., CA

ROSENBAUER FX 1/8"

DRAWING NUMBER: madera city, ca2

REV: -

Attachment 4 of Exhibit A: Center of Gravity

Approximate Center of Gravity
Calculated

City Name: MADERA CITY, CA3

Chassis Vertical Center of Gravity From Ground		
Tilt Table		From Manufacture
Chassis Track Width-	0.00	41
Degree to Tip Over-	0.00	
Chassis CG (inches)-	0.00	

Ground to Top of Frame-	41
Rear Axle Track Width-	74

	Overall Height of Load	Top of Frame Rails to Bottom of Load	CG Above Frame	Weight	Vertical Moment (Inch Lbs)
Tank & Water (& Foam)- Lower	12	1.5	7.5	2257	16926.88636
Tank & Water (& Foam)- Upper	20.75	13.5	23.875	2566	61265.20341
Hose	34.50	36.00	53.25	1265	67361.25
Pump	18	10	19	1850	35150
Body	87.5	-17	26.75	3520	94160
Ground Ladders	28	13.5	27.5	123	3382.5
Chassis	See Above		0.00	17511.9	0
Personnel (If 0 included in Chassis Weight)	56	4	32	1000	32000
Equipment	72	-16.75	19.25	5625	108281.25
Aerial Device	See Drawing			0	0
		Total	11.72	35717.9	418527.0898

CG Above Ground	52.72
Verticle Center Of Gravity Height Compared To Track Width (To Be Less Than 80%)	71.24%
Horizontal Center of Gravity (From Rear Axle)	90.64

Attachment 5 of Exhibit A: Weight Info.

Rosenbauer- South Dakota

DEPARTMENT: **MADERA CITY, CA3**

Wheel Base	194
C A	134
Cab to Pump Compartment	3
Pump Compartment	50
Tank Length Lower	113
Tank Length Upper	113
Body Length	160
Total Tank Capacity	530
Aerial Size	0

rosenbauer
Firefighting Technology
READY TO SERVE™

Percent of Weight to Front Axle		
Water (& Foam) Lower	Body	Pump
4.38%	0.00%	54.64%
Water (& Foam) Upper	Aerial	Hose
4.38%	NA	0.52%

	TOTAL WT	FRONT WT	REAR WT
Water (& Foam) Lower	2,257	99	2,158
Water (& Foam) Upper	2,566	112	2,454
Body	3,520	0	3,520
Pump	1,850	1,011	839
Aerial	NA	0	0
SUB TOTAL	**10,193**	**1,222**	**8,971**
Chassis	17,512	13,441	4,071
SUB TOTAL	**27,705**	**14,663**	**13,042**
Miscellaneous Equipment	3,125	1,117	2,008
NFPA 1901 Equipment Allowance	2,500	-98	2,598
NFPA Personnel Load (Included in Chassis if 0)	1,000	1,000	0
Hose Load	1,265	7	1,258
Ground Ladders	123	0	123
	0	0	0
TOTAL	**35,718**	**16,688**	**19,030**
		46.72%	**53.28%**

NOTE: Weights shown are approximate

Proposed chassis information:	Brand:	**ROSENBAUER**	Crew Doors:	4	
		2 Wheel Drive			GVWR
Axle Capacities:	Front:	18,000	Rear:	24,000	42,000
Estimated Chassis Weight: (includes +5% variance)	Front:	13441	Rear:	4071	

NOTE: Chassis weights MUST BE VERIFIED by the DEALER. Dealer will be responsible for confirming the axles are adequate for the proposed apparatus. 1000# extra capacity per axle is recommended.

Exhibit B: Budget Amendment

CITY OF MADERA
REQUESTS FOR TRANSFERS

TO: **Director of Finance** **Fiscal Year of Budget:** FY 2021/22

FROM: Matthew Watson

Purpose Ref. Nos.	AMOUNT *(No Cents)*	FUND #	FROM DEPT #	FROM PROJ. & OBJ. #	TO DEPT #	TO PROJ. & OBJ. #
1	$ 751,460	1026		**3325**	1026	**7000**
	$			-		-
	$			-		-
	$			-		-
	$			-		-
	$			-		-
	$			-		-
	$			-		-
	$			-		-

Purposes of Transfers:

To transfer reserve funds to an expenditure account to cover the cost to purchase of a new fire truck

NOTES: **Transfers can only be made within the *same* fund. Transfers among *different* funds, and *new appropriations* (budget *additions*) must be approved by the City Council.**

Signatures:

Department Head Request: _____ **Date:** _____

City Administrator Approval: _____ **Date:** _____

Director of Finance Approval: _____ **Date:** _____

Process for Consideration of Request Form:

1. Submit completed, signed request form to the *Director of Finance* for preliminary review.
2. The Director of Finance will recommend that the City Administrator approve or deny the request.
3. The City Administrator will approve or deny the request.